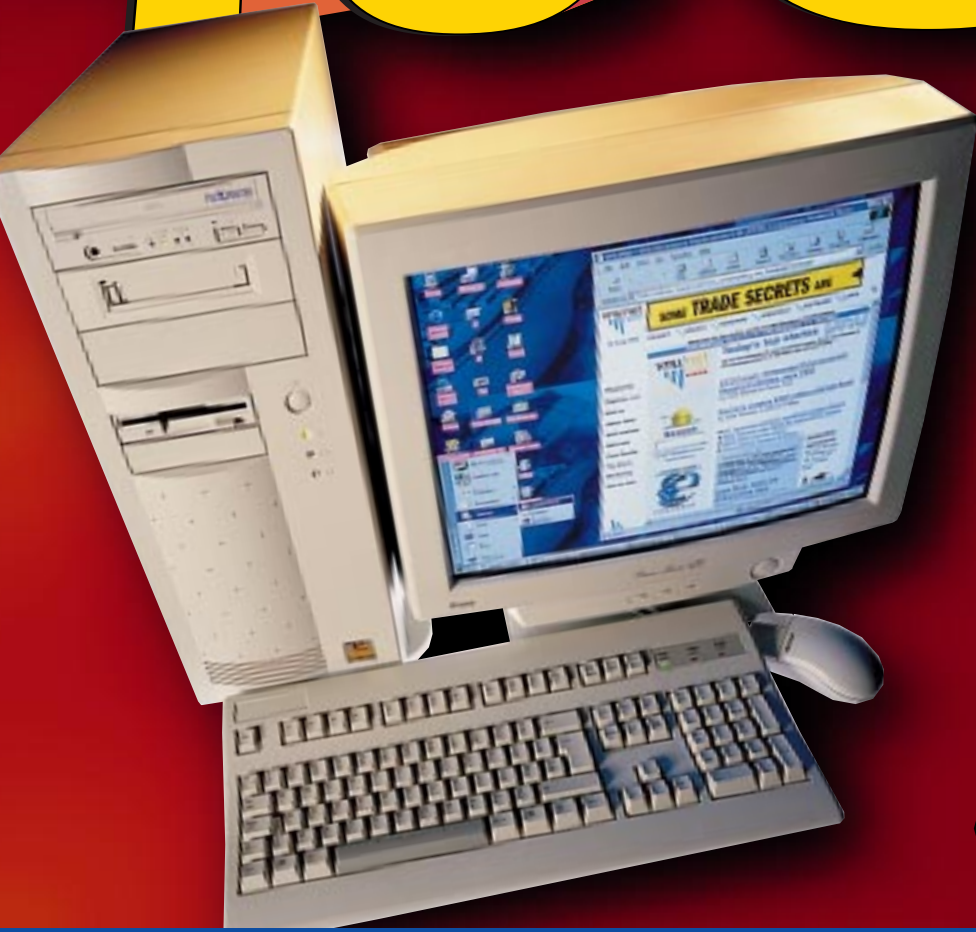**New Look!**

PERSONAL COMPUTER WORLD

Expert opinion you can trust

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PERSONAL COMPUTER WORLD

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450MHz PII

The big picture: PII power-packs push for a place on your desktop

☞ **p160**

PERSONAL COMPUTER WORLD

hands on
advice

The 450MHz chip is here. But confusion reigns, and competition is keen.

Intel inside

Performance measured in megahertz has been more than adequate for as long as I can remember, but this month our mainstream group test features 450MHz chips — that's just a shade under half a gigahertz. If you're waiting for Intel, the full gigahertz is said to arrive around the time of the millennium, hopefully free of any Year 2000 problems.

But why wait for Intel? The other processor manufacturers are valiantly hanging in there; but who would seriously consider buying one, unless money really was too tight to mention? I'll tell you who: me. I don't know about you, but I feel slightly confused about Intel's recent raft of PC processors. The company correctly spotted the large number of people flocking to buy entry-level to mid-range PCs and found its selection of chips could not compete: it's hard to build a £600 PC when two thirds of the price is the chip. So Intel responded with the Celeron, a Pentium II without the Level II cache. This cache, albeit expensive, is there for a very good reason, and as Intel discovered, removing it results in an unimpressive performer. So in its latest Celerons, Intel put the cache back — a quarter of the size of the normal Pentium II's, but twice as fast! Confusing? Yes. Better or worse? Tricky to say really, but in tests so far, not quite as good. We can definitely say, however, that this new chip, codenamed Mendocino, is currently available in 300 and 333MHz flavours, the former clearly distinguished from the old cacheless and inferior 300MHz Celeron by the placing of a little letter a after it. Clear as mud.

> **The old Celeron is still in circulation, and it's often difficult to find out whether you're GETTING THE NEW ONE OR NOT when ordering**

Where it all gets really confusing is that the old Celeron is still in circulation , and it's often difficult to find out whether you're getting the new one or not when ordering. Throw the old standard Pentium II into the equation, and you could have the choice of three different processors when buying a 300MHz Intel PC. So it pays to be careful when specifying which you're after, or look elsewhere entirely. AMD has released its mid-range K6-2 3DNow! chip, which could end up boasting performance that would allow you to forgive its name. A new set of built-in instructions could significantly improve games performance, so long as developers refer to them. Microsoft already has in its latest version of DirectX, used to write games under Windows.

Intel has always been good at the high end, such as the 450s reviewed in this issue, but it clearly has to take entry- to mid-level competition from companies like AMD very seriously — good news for the PC buyer. As for myself, I'm seriously considering an alternative to Intel for my next processor. Either way, I'll back it up with one of the new breed of 3D graphics cards [p190] to prove that top performance doesn't always rely on processors with prices as big as their labels.

Finally, thanks to the enormous number of you who have written over the past month with your comments on the new-look *PCW*. It's not too late to let us know what you think, so please email me at newlook@pcw.co.uk.

Gordon Laing, Editor

WELCOME TO THE **NOVEMBER 1998** PERSONAL COMPUTER WORLD CD-ROM

November **COVER DISC**

GAMES | APPLICATIONS | LIBRARY | ENTERTAINMENT | INTERNET

New this month, we have a great new Entertainment Section for you from In Chair Viewing which includes exclusive music and video from top bands as well as a film trailer of the great new Nicholas Cage film, Snake Eyes.

Check out Grim Fandango in *Featured Software* if you fancy a game with a surreal twist. And, if you have access to the internet, take a look at Spinner which enables you to listen to your own choice of music, straight off the web.

Don't forget our *Software Library*, where there are over 50 more games, applications and essential utilities. If you want the best software, just load that disc up now!

Grim Fandango

PCW DETAILS

Operating system
Windows 3.1 or higher
Limitations
Full version
Sales contact
0181 970 1909
Technical support
0181 207 1792 between 10am-1pm, and 2pm-5pm (on Wednesdays there's a 2pm start)

Something's rotten in the Land of the Dead. Manny Calavera, travel agent at the Department of Death sells luxury packages to souls on their journey to eternal rest. But there's trouble in paradise and Manny needs help. This new and unusual graphic adventure from LucasArts is inspired by the films Chinatown, Casablanca and The Big Sleep, and mixes classic *film noir* with the exotic mythology of ancient Mexico. The elements at the core of Manny's struggle are danger, drama and greed.

Manny is employed to pick up people in the Land of the Living and set them off on a four-year journey to their eternal resting place. But he is caught in the middle of a conspiracy that prevents him from getting on, even if he meets his sales quota. By stealing a prime prospect, he sets a chain of events in motion that threaten the destiny of his soul. The game puts you right inside Manny's strange world. This demo contains a selection of the hundreds of puzzles contained in the full version which have been designed to challenge both the novice and veteran adventure gamer and it takes you to some of the full version's 90 exotic locations, ranging from the bustling metropolis of El Marrow, to the mountaintop portal to the Ninth Underworld.

Technical information to help you use the CD

✔ **System Requirements**
You will need a PC running Windows 3.1 or Windows 95. Please check individual products for specific system requirements. For best results, run the CD-ROM on a Pentium PC with at least 16Mb of memory.

✔ **How to use the CD-ROM**
Quit existing applications — if you have 16Mb or more of memory, you do not have to do this, but you will nevertheless get better performance if not too many other applications are running.
Put the disc into your CD drive.
Windows 95 — If you have got Windows 95 the *PCW* interactive loader will appear on your screen. But if your CD does not autoload, go to Start/Run and type in
<CD Drive>:\pcw.exe
Windows 3.1 — From Windows Program Manager choose File/Run, then type in
<CD Drive>:\pcw.exe
and press enter.

✔ **CD-ROM Problems**
If you have problems with individual products, please check in the magazine or on the CD for company contact details.
If you have general problems with the CD, the technical helpline is open on weekdays from 10:30am - 12:30pm and 1.30pm-4:30pm. Phone 01274 736990.
If you have problems with the CD-ROM (such as a message reading "Cannot read from drive D:") return the disc, with a covering note and clearly marked "PCW CD November 98" to:
TIB plc, TIB House, 11 Edward Street, Bradford, BD4 7BH
A replacement disc will be sent to you by post.

✔ **Getting your software onto our CD**
PCW is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc.
For cover-mounted disc enquiries please telephone Afshan Nasim on 0171 316 9592 or email him at afshan_nasim@vnu.co.uk

C D - R O M | **H E L P L I N E** | **0 1 2 7 4   7 3 6 9 9 0**

Sin

Elexis Sinclaire, head of SinTek Industries, is spreading a DNA-altering drug as part of her plan to take over the world with an army of mutants. As Colonel John R. Blade, you are going to make her pay for her sins. Sin is a first-person, character-driven, story featuring multiplayer gameplay powered by an enhanced Quake II engine. Your actions affect the course of the game, so no two battles will be the same. Your arsenal includes snipers, remote control detonation and new weapons that may literally rip you apart.

PCW DETAILS

Operating system
Windows 95
Limitations *Limited levels, cut-down features.*
Sales contact
01865 264 817
Technical support
support@grolier .co.uk

Nightmare Creatures

With excellent graphics this third-person 3D perspective adventure is comparable to Tomb Raider. Playing the part of either Father Ignatius Blackward or Nadia F, you must find and destroy the cause of the virus that is turning Londoners into flesh-eating zombies. The game is set in a spooky atmosphere, with great sound effects and music, realistic smoke and fog. Nightmare Creatures pushes game graphics and audio to their limits so you will need a fairly powerful machine to appreciate all the features at their best.

PCW DETAILS

Platform
Windows 95
Limitations *Limited tracks, cars and race duration.*
Sales contact
0181 944 9300
Technical support
0181 944 9000

Jetspeed

Jetspeed, from HP, is an office network racing game for up to four players. Designed to communicate the benefits of network-sharing printers and servers, you race in a virtual office environment. There's a full screensaver function and a selection of animated and 3D sequences to download. Network-ready, and with single and multi-player options you can choose from three LAN race circuits and a selection of cars which can be swapped between a London taxi, a pickup truck, a Jaguar XK8 or a black F355 racing Ferrari.

PCW DETAILS

Operating system
Windows 95
Limitations
Early-levels demo.
Sales contact
+45 8680 2700
Technical support
None

GAMES   **APPLICATIONS**   LIBRARY   ENTERTAINMENT   INTERNET

FreeHand 8

FreeHand 8 has been developed to combine the sophistication required for PostScript print output with the need to generate compact graphics for web pages. It offers an ideal authoring front end for Flash. You can use the familiar illustration environment to create effects, layouts, or entire animation sequences and transform any multi-object blends or text on a path, into Flash animations, thus creating vector morphs and animated text. Other features include printable transparency capabilities which keep documents in an editable vector format, and a magnifying lens which can be useful for creating live insets or annotations. You can also export and import new file formats including Corel 7, WMF, and EMF, DCS 2, Flash 2 and the latest versions of Acrobat, Illustrator, Photoshop, and Insta.HTML 2 which provides an easy way to transform FreeHand files into a WYSIWYG HTML format.
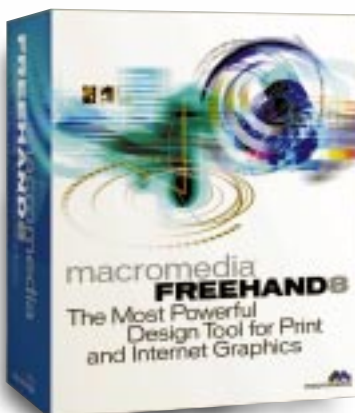
PCW DETAILS

Platform
Windows 95
Limitations
30-day trial
Sales contact
0181 358 5857
Technical support
None

EarthTuner

EarthTuner combines RealAudio and RealVideo with a database of audio, video and web links, to access radio, TV, and net broadcasts from the web. By selecting from this huge list of sites providing streaming media, you have instant access to programs being broadcast from around the world. Choose stations in a number of ways: from an animated globe, to a browse window, using the integrated search engine to find any radio station whose name you can remember.

Spinner

Spinner lets you access over 100 channels of music via a simple, free, interface that works with your web browser. With immediate access to Title, Artist, Album and Channel information, you know exactly what you're listening to, and on which Spinner.com channel you're hearing it. View the album cover of the current track, pre-select seven favourite channels, customise two channels with favourite songs and see what's playing on any other channel by rolling over it with your mouse. Then, you can go ahead and purchase the CD online.

WaveLab 2.0

WaveLab 2.0 is a fast audio editor that enables real-time processing during playback in an easy-to-use graphics interface. This application contains all the tools you need to record, edit and make detailed analyses right through to a final cut and mastering, with quality results in 24-bit, using an appropriate audio card. The package can be used to archive files using the integral database. WaveLab can communicate with most current samplers, via SCSI and can transfer multisamples in a matter of seconds. WaveLab is designed to allow you to add third-party plug-ins and processing tools, expanding your system to suit your particular working requirements. And, to realise good ideas spontaneously, WaveLab's speed-optimised audio editor lets you take care of the smallest detail in real time, whether you are adding more punch to the bass, boosting the high frequencies, or filtering out noisy notes from a clumsy bass player — and, you don't need an audio engineering qualification to do it.

PCW DETAILS

Platform
Windows 95
Limitations
Full version
Sales contact
0800 376 7070
Technical support
None

Software Library

Unless otherwise stated, new versions of featured software are not upgrades, but standalone installations. If you wish to install the latest version of a product onto your machine, ensure that you uninstall or remove the older version first.

Essential Utilities

• New
WebLeech 2.1
(Windows 95/NT)
The purpose of this application was to enable the user to download files which are attached to web pages, but without having to click on each link and file individually to save them. Instead, a list of available files is created and either all or selected files can be downloaded. (Freeware)

• New
Microsoft Excel Viewer
(Windows 95/NT)
Excel Viewer 97 is a tool that lets Excel users share their spreadsheet files with more people than ever before! (Freeware)

• New
Microsoft Word Viewer 97
(Windows 95/NT)
Word Viewer lets those who already use any version of Word to share their documents with users who do not. (Freeware)

• Add/Remove 4Good 1.0
(Windows 95)
The utility that helps rid you of those unwanted entries in Control Panels' Add/Remove list. (Limited use shareware)

• Adobe Acrobat Reader 3.01 + Search
(Windows 3.1/95)
The free Adobe Acrobat Reader lets you view, navigate, and print PDF files across all major computing platforms. (Fully functioning reader)

• DirectX 6
(Windows 95)
The latest set of essential video and audio drivers that are required to run some of today's processor-hungry games and applications. (Fully functioning drivers.)

• EzDesk for Windows 1.8
(Windows 95)
A utility that manages the desktop icons' layout. EzDesk can restore a desktop icons' layout to a previously saved arrangement.

(Limited function shareware)

• Fontastic 4.2
(Windows 95)
Fontastic is a powerful font management tool designed for Windows 95. It allows quick and easy access for viewing all the fonts stored within your system as well as providing printed samples. (31 day evaluation)

• GIF Construction Set 1.0Q
(Windows 3.1/95)
The quickest and most professional way to create transparent, interlaced and animated gif files for web pages. (30-day shareware.)

• Graphics Workshop 1.1Y
(Win 3.1/95)
A superlative image management package that allows you to view, convert and catalogue your images in a wide variety of formats. (30-day shareware.)

• Microangelo 2.1
(Windows 95)
Provides access to icons of all sizes and colour formats used by Windows 95. Browse, manage, create, and edit icons from 8x8 to 64x64 pixels in size and up to 256 colours. (30 day trial)

• MIRC 5.41
(Windows 3.1/95)
Provides a user-friendly interface for use with the Internet Relay Chat (IRC) network. The network is a virtual meeting place where people from all over the world can meet and talk. (30-day shareware.)

• NearSite 6.1
(Windows 95)
NearSite allows you to retrieve and store internet files so you spend less time online. NearSite bookmarks can be set to automatically retrieve web pages from the net and keep them refreshed as often as you wish. (30-day evaluation)

• Net Toob 3.5
(Windows 3.1/95)
Net Toob Stream enables playback of online streamed, as well as online and offline downloaded MPEG-1, Video for Windows (AVI), QuickTime for Windows (MOV), QuickTime VR "object" files, Autodesk Animations (FLC/FLI), WAV audio and MIDI audio. It is reliable, easy to use and integrate, and works with multiple browsers.

• Netscape Communicator 4.05 - Standard Edition
(Windows 3.1/95)
One of the premier internet suites, including Netscape Navigator. (Free version)

• Paint Shop Pro 3.11
(Windows 3.1)
Fully-featured painting and image-manipulation program. Features include powerful

painting tools, photo retouching, image enhancement functions, batch file format conversion and support for over 30 different file formats. (30-day shareware.)

• Paint Shop Pro 5.0
(Windows 95)
The latest version of this popular graphics editor, with powerful new features such as complete layer support, Picture Tube brushes, CMYK separations and pressure-sensitive tablet support. It includes enhancements to Paint Shop Pro's flexible painting and retouching brushes, adjustable cropping and selection tools, and image enhancements. (30-day evaluation)

• SpellWrite for Windows 1.6/2.1
(Windows 3.1/95)
A unique utility that can spell-check any Windows program instantly (e.g. email, accounts, database etc) from a designated hot-key. It has an 85,000-word dictionary in UK format. (30-day shareware).

• VuePrint Pro 6.0
(Windows 3.1/95)
VuePrint is the most widely used Windows program for viewing images. You don't need to know anything about images or file formats to use VuePrint, just tell it to open a file and it automatically displays any images it finds. (15 day evaluation)

• WinZip SR 6.3 SR-1
(Windows 3.1/95)
Industry-standard compression/decompression utility with automatic built-in disk spanning support for multi-disk Zip files. (21-day evaluation version)

New This Month

• Asteroid Impact
(Windows 3.1/95)
Enjoy seemingly endless levels of asteroid blasting, rock smashing, mayhem. This is massive and relentless obliteration on a grand scale, and loads of fun. (Shareware)

• Alma Page Generator
(Windows 95)
A simple utility to transform the life of most web site developers. Massive sites can be created using database-driven pages but requires no CGI scripts. Runs on any server. (21-day evaluation)

• Critical Mass
(Windows 95)
Critical Mass is an original, hideously addictive game set in the future, where you are the commander of a squadron of spaceships. You will

► **TURBO SOLVE PRO — THE PUZZLER'S FRIEND**

• AntiViral Toolkit Pro
(Windows95/98 & NT)
A complete package of protection against computer viruses. AVP is easy to use and has a very large antivirus database. (Limited Demo)

• Auto ShutDown
(Windows 95 & NT)
Automated shutdown scheduling utility for your computer. (Shareware)

be sent on one of 30 different types of mission, ranging from protecting a convoy, to attacking an enemy starbase, or defending Earth. (Limited demo)

• CheckScreen
(Windows 3.x/95/NT)
This software was produced by the Monitors Matter

Campaign — a user-education initiative to advise and educate computer users regarding the importance of correct display selection on their machines. (Freeware)

management principles to help you stay in control of your time and information. It provides you with a system that supports delegation, planning, tracking and workgroup interaction. The underlying principle is to help you make the best use of your time. (Sponsored free version)

• Exclusive Firefight
(Windows 95)
The latest release from the stable of Sean O'Connor's Windows Games is Firefight, a WW II real-time simulation game. It relies on the use of artificial intelligence to create the most realistic and fun game of this genre to date, while having a user interface so simple and intuitive that you can learn to play in minutes. (Shareware)

• Mother Of All Battles
(Windows 95)
A great strategy game for two to six

• Easy Zip 98
(Windows 95/NT)
Easy Zip 98 is a comprehensive Zip Manager that perfectly accommodates your everyday needs . (Freeware)

• Edesk '97
(Windows 3.x/95)
A fuss-free PIM based on time

human or computer players. The object of the game is to capture the world, starting from your single home city. Each city can build units (using a range of weapons from tanks, to planes, paratroopers, submarines or even aircraft carriers) in order to explore the world and defeat your enemies. (Limited demo)

• Turbo Solve! Pro
(Windows 95 & NT)
Turbo Solve! Pro is a powerful, easy-to-use, 32-bit word puzzle solving program for Windows 95 and NT, capable of solving a wide variety of word puzzles including crosswords, anagrams, in-words, pair-up puzzles, word searches etc. (Shareware)

• And, there's lots more to keep you amused: Microfile Pro, Star Stream Birthday Reminder, Table of Contents, Terrapin FTP Browser and WordSpin.

GAMES   APPLICATIONS   LIBRARY   **ENTERTAINMENT**   INTERNET

ICV Entertainment Section

The first-ever dedicated entertainment section in this month's CD-ROM is brought to you by In Chair Viewing. ICV is rapidly establishing itself as a front runner in non-game multimedia entertainment. Since its conception three years ago, the company has gone from strength to strength placing its work on over seven million CDs around the world, from movie promotions for Armageddon and Tomorrow Never Dies, to enhanced music CDs for Garbage, Brian May and Sean Lennon, amongst others.

The ICV Entertainment Section requires Windows 95 or NT. Your display should also be running in 16-bit or thousands of colours. The program will detect whether your PC is running at these levels and, if necessary, will prompt you to reset your graphics card if necessary.

In this first ICV Entertainment Section, the stops have definitely been pulled out with world exclusives from Garbage and the Beastie Boys, a trailer from the new Nicholas Cage film "Snake Eyes" as well as the excellent "Legacy" video from Mansun.

Garbage

Another In Chair Viewing exclusive, this is the first time that this interview with the band has been publicly available in any form. Garbage discuss their latest album Version 2.0 which entered the UK chart at number one. There is also a chance to see excerpts from the excellent videos from I Think I'm Paranoid and Push It. When Garbage lead singer

Shirley Manson saw the multimedia work that In Chair Viewing had produced for the band, she personally requested that their website be based on it. So once you've seen the entertainment section, go and visit www.garbage.com to find out more about the band.

Mansun

A chance to view part of the Legacy video, recently released as the first single from Mansun's new album, Six. For more information on the band and their forthcoming tour dates, check out the Parlophone website at www.parlophone.co.uk.

Beastie Boys

An insight into the way-out world of the Beastie Boys sees the band doing the other thing that they love — playing basketball. This feature coincides with the release of the band's Hello Nasty album and precedes the release of their second single from that album, Body Movin'. The Beastie Boys will be touring Europe in the new year and you can find out more from the band's web site at www.grandroyal.com

Snake Eyes

A trailer for the forthcoming Brian de Palma film Snake Eyes, featuring Nicholas Cage and Gary Sinese.

▼ **LOTS OF INFORMATION ON MANSUN AND YOU CAN WATCH SOME OF THE VIDEO, TOO**

▲ **THE BEASTIE BOYS PLAY BASKETBALL, THEIR FAVOURITE GAME**

▶ **THE SNAKE EYES TRAILER PLAYS FULL-SCREEN ICV VIDEO ON YOUR PC**

▲ **LEAD SINGER OF GARBAGE, SHIRLEY MANSON**

In this suspense thriller, tarnished police detective Rick Santoro (played by Nicholas Cage) is drawn into an intricate conspiracy plot to assassinate the US Secretary of Defense at a heavyweight boxing match. Cage joins forces with old friend and Department of Defense staffer Gary Sinese to untangle the events preceding the assassination, find the mysterious woman who spoke to the Secretary before the assassination, and pin-point the suspects in a crowd of 14,000 fight fans. The Snake Eyes trailer plays full-screen ICV Video which enables an ordinary personal computer to play full-screen and fluid video with no installed software or MPEG cards. Not only this, but you no longer need to worry about having the right video software or having to install material onto your hard drive. ICV Video needs no installation and plays directly from the CD-ROM drive, leaving no residue whatsoever on the computer.

COMPUSERVE.

CompuServe trial

The UK's leading Online Internet Service offers fast and easy access to the internet and a one-month trial which includes *free*: 650 hours of online time, personalised email address and web space. The offer is valid for the first month only and the free online time must be used within the first month. All prices are set in US Dollars but will be charged in your local currency, based on the prevailing exchange rate.

PCW DETAILS

Platform
Windows 95 and 3.1
Limitations
One month free, billed if use of service is continued
Sales contact
(Account enquiries.)
0845 3551000

ClaraNET

ClaraNET trial

ClaraNET offers full internet access, email, the worldwide web and newsgroups in packages, including free 24-hour technical support. There is no connection nor start-up fee and 25Mb of free web space is included free with your account. The ClaraNET trial is *free for a month* — you will be billed at the end of your trial month if you wish to continue using the service. Please read the "terms and conditions" online for full information.

PCW DETAILS

Platform
Windows 95 and 3.1
Limitations
One month's free membership, 650 free online hours, to be used in first month.
Sales contact
0990 134819

PCW CD OnLine
Access the internet direct from the opening screen!

By clicking on the web link banner at the top of the main screen, you can run your browser and access the PCW CD OnLine direct from the disc. CD OnLine gives you up-to-date access to sites and information relating to the content of this month's disc. And you have access to the

Personal Computer World web sites, Vnunet.com and Jobworld.co.uk, plus up-to-date Technical Info about the CD and a preview of what's on next month's disc! And if you have enjoyed the magazine and the CD, subscribe via email while you're online!

JOBWORLD

Jobworld.co.uk is a free service which provides you with access to thousands of new IT, business and finance vacancies every day. All you have to do is browse the site by job sector or search on a specific set of job skills or requirements. The Jobworld Email Alert service offers extra freedom by sending only details that match the job seeker's preferences,

allowing the recipient to control exactly what information is sent and when. Jobworld also offers links to job sites overseas, a guide to IT contracting and comprehensive lists of jobs from the top recruitment agencies in the UK. Jobworld.co.uk — be the first to know!

Jobworld

VNUNET

Vnunet.com offers speed of delivery, accuracy and a breadth of coverage from five market-leading weeklies: *Computing, Accountancy Age, PC Dealer, Network News* and *PC Week*, generating up to 50 stories every day of the working week. With correspondents in Europe, the US and Asia contributing daily to the VNU Newswire, a round-the-clock news service is available exclusively at vnunet.com.
More detailed information is available in a wealth of in-depth articles, news analyses and product reviews from our stable of monthly publications, including such titles as *Personal Computer World* and *Management Consultancy*, plus some of the best editorial material from our portfolio of 15 business and consumer titles.

vnu|net.com

The OS Atlas 2

Find your way around Great Britain

▼ **TAILOR A MAP TO SHOW THE INFORMATION YOU WANT**

▼ **SNAPS, VIDEOS AND MODELS CAN BE VIEWED**

▲ **FAST ACCESS TO THE AREAS YOU WANT TO KNOW ABOUT**

▼ **CHECK OUT THE TYPICAL CLIMATE OF AN AREA BEFORE YOU GO**

Whether you simply want to find your way around London, or to find details about economic and social statistics in the European Union, then look no further than this month's cover disc and the interactive Ordnance Survey Atlas of Great Britain (OS Atlas 2). This second edition OS Atlas from Attica, gives you easy-to-use, high quality-reference and map information with the added facility of multimedia so it can be used for fun or serious study. There are five main areas in its content: Ordnance survey maps, Map Skills, Quiz, GB Data and EU Data.

The OS Atlas 2 offers faster access than before to a huge range of mapping detail with full coverage of Great Britain at 1:250, 000 scale, plus extracts at 1:50,000, 1:25,000 and 1:10,000. The Atlas provides a comprehensive gazetteer of 45,000 locations with fast access to mapping of a precise area of interest. And there is the added bonus of a zoom capability to enlarge all maps and a full-screen print facility for maps and plans. The map display can be easily customised by switching certain features on or off. For example, you could tailor a map to only show you the railways and water features of a particular location.

The new additions to OS Atlas 2 includes 45 city centre and town plans, a locator map for fast and easy navigation, and distance measuring, in addition to over 300 Media Pin hotspots. These hotspots give you access to pictures, text, video or landscape models illustrating sites of cultural, architectural or historical interest in any given area. And yes, that does include snapshots of the racing at Silverstone and the "Corkscrew" ride at Alton Towers!
Statistical information maps of Great Britain are included, together with European Union facts and figures so, at the touch of a button, you could discover the employment rate in Finland or military expenditure in Italy. There is also a map skills section, which provides guidance and activities on using and interpreting map legends and symbols, and understanding latitude and longitude. You can also test your geographical knowledge of Great Britain with the Around Britain Quiz.

The system you will need to run the OS Atlas 2 CD is a 486DX 66MHz processor, 8Mb RAM, Windows 3.1, 16Mb RAM Windows 95, 8Mb hard disk space (minimum 4Mb), SVGA display of 256 colours, a double-speed CD-ROM drive, Microsoft mouse or compatible, a 16-bit sound card, headphones or speakers. Additionally, you will need to be running MS-DOS 5.0 or later, Microsoft Windows 3.1 or later, or Windows 95. You will also need Microsoft CD-ROM Extensions 2.2 or later. Full installation instructions are provided.

PCW DETAILS

Platform
Windows 95 and 3.1
Limitations
Full version
Sales contact
Attica 01865 791346
Technical Support
0345 413166

CD-ROM | **HELPLINE** | **01274 736990**

news

NEW COMMS

Slow lane to future on BT Highway

British Telecom has launched its Highway hybrid ISDN and analogue service, putting what must be the final squeeze on audio modems.

BT Highway splits a standard line into two channels which can be used in either digital or analogue mode, in any combination. It also gives you two extra numbers: digital and analogue. It is not the hoped-for cheap digital service and looks only marginally less dated than audio modems. But it does offer a convenient upgrade path at much the same cost as a second standard line. Many modem users find they need a second line to receive calls while they are online.

BT says terminal-adapter makers have cards ready from as little as £50 and, unlike some older models, these will not overload your serial port *(see Point of View, p28)*. Converting from an existing standard line costs (inc VAT) £175.08, with a quarterly rental of £81; or you can pay an initial £116 plus £120 a quarter, with the first £45-worth of calls free. Startup charges for a new connection will be £292.58 or £233.83, depending on the same options. Business prices are slightly different and, remember, all must be compared with the cost of *two* standard lines.

BT Highway replaces your standard phone jack with a book-sized white box *(see picture)* bearing four sockets: two ISDN and two analogue. As with straight ISDN, two lines can be aggregated to give a line speed of 128Kbps, though this incurs a double-time charge. Even a single line at 64Kbps is faster than a 56K modem, which delivers 40-50Kbps. An advantage is that you can still use your old equipment and Select Services, like caller diversion and caller display. But ISDN looks old hat, with ADSL and cable modems coming soon.

BT marketer Vishal Khakhar does not see cable presenting competition. "ISDN guarantees you bandwidth. The speed of a cable modem depends on how many people are online." He said xDSL, when it comes, will be sold as an extension to the Highway service. It offers from 1Mbit/sec downstream.

CLIVE AKASS

Highway hotline 0800 800845
www.highway.bt.com

PROCESSORS

Vendors like 450 chips

PC vendors have flocked to support Intel's **450MHz Pentium II** processor. Several manufacturers unveiled products shortly after the chip's release, including Dell, Acer and IBM. Gateway also announced plans to use the chip.

Intel says that the 450MHz will give approximately a ten percent better performance than the 400MHz processor for a similar price. An Intel spokesperson stated that users could expect better speech recognition and better DVD with the 450MHz. He said, "The Celeron is a good basic processor. But if you really want to push out the boat and have something that will last for a few years, you'll want to go for the 450MHz."

Intel also said that it was working with games and children's software developers to help them "harness all the power and performance" of its latest processor.

SUSAN PEDERSON

• Read our 450MHz PC group test on page 160

DESKTOP

iMac perks up Apple

The iMac is flying out of UK shops, despite reports of complaints from US customers. Apple's online support site has been flooded with messages from users having problems with Epson printers, the USB and machine upgrades. Apple has now released a software upgrade which, it says, solves most of the problems.

Apple refused to comment on the user complaints and said it had no solid sales figures yet. But Mac resellers in the UK have reported brisk sales and hundreds of enquiries and that there had been "many, many orders". Another dealer said that it was nearly out of stock. Inteco analyst Pete Day was surprised by the response, as he had thought that Apple had priced the iMac out of the market. "They've obviously hit on a product formula, though," he said.

SUSAN PEDERSON

Companies put 'spy' in laptops

Companies can monitor their laptops for games and mucky pictures using a new service set up by offline-storage specialist, Netstore.

Laptops have replaced desktops at many firms, either to help people work at home or because staff spend a lot of time travelling. This scattered equipment is a nightmare for IT staff who have to update and audit data and software — a tricky task, even on fixed networks.

Netstore takes over the task by installing updates, such as the latest anti-virus patches, when users log in to collect email or synchronise data. It will also optionally download the "spy" module

to monitor what is on the laptop. Chief technology officer Jeff Maynard says it can be used only with the user's permission. "The reason we do it is to ensure there is no unlicensed software on the machines which can cost the company a lot of money if discovered," he said.

Netstore has just had a £3m capital injection to develop this and other schemes. It was started three years ago to offer low-cost encrypted storage (a kind of electronic safety-deposit box) over the net. But it has found that there is an explosion in demand for laptop management support.

Ian Catlin, advanced technology guru at Cisco, which uses Netstore, said he had no intention of prying into how staff use their laptops. "We couldn't, even if we wanted to. There is nothing to stop them renaming files as something innocuous like sales.txt."

Netstore www.netstore.co.uk;
01344 644004

1 in 3 notebooks break or are stolen

Companies reckon about one in three of their laptops with be stolen or broken during their working life. Cisco's Ian Catlin *(see above)* says the figure for his company is at least 30 percent — and that's in just 14 months, after which new machines are bought in.

One reason for the high breakage level is that laptops

have a much rougher life than desktops. But manufacturers, too, are to blame, according to a Gartner Group report last year which criticised them for not paying enough attention to robustness.

They seem to be getting the message. Panasonic claims to have concentrated on low-cost ruggedness with its new ToughBook 45, which boasts

anti-shock features and an alloy-protected screen.

Prices (ex VAT) start at £1,499 for a 233MHz MMX model, including a three-year warranty, a 4Gb disk, and 32Mb of RAM. Prices (ex VAT) of a 266MHz Tough Book 71 range *(pictured, above)* start at £2,299.

Panasonic 0500 404041

STAR BUY

Computers beat printed star maps hands down as a way to make sense of the night sky. But you don't want to lug your laptop around when you space out and gaze at the Great Out-There. Slip your CE palmtop into your pocket, however, and you can take advantage of Sticky Software's £20 Pocket Universe.

It can be bought online from www.mobilesoft.com

STAR BUY

Here's a dotty way to protect your PC. SelectDot stamps it with an identity number the size of a pinhead and registers it with a national database, so that if your machine gets stolen, its ownership can be traced.

Selectamark 01689 860757
www.selectamark.co

Dinobot

Shops are already preparing for Christmas — and Barney, a purple interactive dinosaur, looks as if he could be a winning present. He can be a standalone playmate or, plugged into a PC, an interactive teaching aid in conjunction with any of five CDs. Tiny Computers is selling Barney with a PC as part of an early-learner package. Prices start from £899 (ex VAT).
www.tiny.com

Dun roaming net

Debt collecting services have come to the net. Just fill in the details of a commercial debt at the Euler Trade Indemnity site. Collection is "processed swiftly by our professional team," said managing director,

Tony Bushell. Commissions start at eight percent for the first £5,000, reducing to two percent for sums over £10,000. ETI fees for international dunning are higher.

ETI 0171 512 9333;
www.tradeindemnity
.com/yourdebt.htm
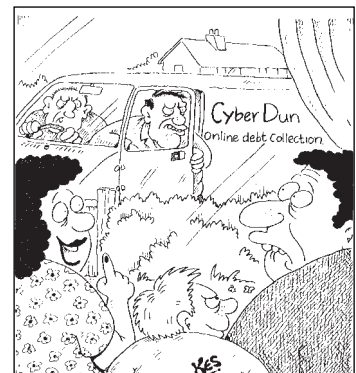
'That'll teach you to withhold his pocket money for spending too long on the net'

news

▶ MMX UPGRADES Sunbelt is offering Nova Max MMX-class upgrades to Pentium machines clocking between 75MHz and 150MHz from £80 (ex VAT). *Sunbelt 0181 715 9913*

▶ NT UNDELETE A version 1.1 of Network Undelete for NT has been released by Executive Software, which claims five times more data is lost to accidental deletions than to viruses. *www.execsoft.co.uk 01342 327477*

▶ EZ-SCSII 5.0 Adaptec has shipped version 5.0 of its £55(ex VAT) EZ-SCSI utility for managing multiple SCSI devices under Windows 98. New features include automatic driver update. *Adaptec 01276 854500*

▶ STUDIED RESPONSE MathSoft has updated its Studyworks Science and Maths CD-ROMs for GSE and A-Level students. *01276 452299 www.mathsoft.co.uk*

NEW CHIPS

IBM ships first fast copper

IBM has shipped the first chips using its new copper connect technology. They include a PowerPC 750 used for embedded applications. The new chips use copper rather than high-resistance aluminium for electron paths, allowing the chip to run either faster or cooler.

The new 750 uses a design that ran at 300MHz on aluminium; copper allowed it to clock 400MHz. A similar 33 percent speed increase could be gained on x86 PC chips made by IBM for the likes of Cyrix and AMD. IBM makes some Cyrix chips for itself and brands them under its own name. The company says it will build copper chips to order for other companies. IBM Microelectronics' Rupert

Deighton said none had yet been received for PC chips. "If someone came to us with an x86 design we would build it." Most copper chips in the pipeline are for specialist uses, although IBM plans to use copper in its S/390 RS/600 and AS/400 server chips.

"You are not necessarily going to get the maximum benefit simply by taking an old design and doing it in copper, because it may have been designed taking the limitations of aluminium into account," Deighton said.
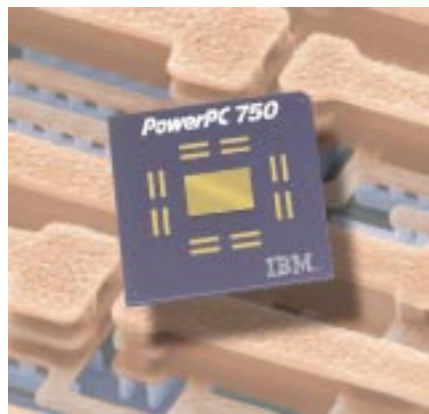
More improvements will be seen next year when copper is used with IBM's new Silicon On Insulation technology. Intel rubbished both advances, but Deighton said: "The longer they stick with aluminium, the happier we'll be." *www.chips.ibm.com*

Dual video card spots
AGP in the market

Imagine says this is the first dual-channel graphics card to use Intel's new, fast AGP port. It lets you run twin screens at 800x600 in 16.7 million colours. A PCI version is available at the same price (ex VAT) at £320, or £370 with video-capture facilities. *Imagine 01727 844744*

POINT OF VIEW

Entering cyberspace without a MAPI

A friend who runs the London office of an international news agency decided to get on the net. Seduced by those flash TV adverts, he asked BT: "Please give me an ISDN internet link." An engineer duly put in an ISDN line.

"That's as far as we go," he announced — leaving my friend, whose technical knowledge starts and ends at the on-off switch, with a mysterious socket and a box marked BT Ignition. I offered help. The box held a Motorola-built terminal adapter (TA) with a PC serial lead. A twin ISDN line passes 128Kbps; a standard serial port passes 115Kbits.

I checked with Bill Peachey, technical director at Hayes, who agreed that the TA could overload the port. Most people use only one 64Kbit ISDN line at a time, but with compression, data-rates even on a single line can top 115Kbps. Few net providers support that compression, according to Peachey, but people should surely be told that their TA is hobbled without a port upgrade. I was amazed to find only Windows 3.1 disks in the box to link to BT Internet. Rashly, I decided to install,

and regretted the decision when a prompt advised me to rate the line at 19.6Kbits. I aborted the install when, without warning, it overwrote Windows 95's MAPI. DLL — the very messaging module my friend would need to file his stories. I finally linked to BT Internet using software from an old *PCW* cover disc. It did not recognise the ISDN line, but I have to say BT's helpline quickly solved that problem. However, BT will have to get its act together if it wants to create a mass market for ISDN.

Clive Akass *gets a user's eye view of a* **BT ISDN kit**

Hand sensor waves in gesture control

Input shorts

⟫ LETTER PADS
These foldable mouse mats can be used for promotions, and vendor, Data Design, says they make for happy mice.
www.data-design.co.uk

⟫ INTERACTIVE PLASMA
Mayflower is offering what it says is the first plasma touch-screen, which can be used with its Softboard software. This allows groups of people to collaborate on a live PC document.
Mayflower 0171 267 0100

A motion sensor developed by Toshiba could lead to a more human way of **communicating with machines**. In the short term, the system, which can recognise a hand against any background and follow its movements in real time, should help people with disabilities and may be included in games.

Already it has been used in a computerised version of the ancient game of Scissors, Paper, Stone, and it could trigger sound in new forms of musical instruments.

In the longer term it will allow gestures to complement or stand in for other input systems such as speech, mouse, or keyboard language, in much the same way as we now use gestures in conjunction with speech.

Creative Station
from CalComp comes with mouse and pen for £99 (ex VAT). Larger professional models are available.
www.calcomp.com

Wacom Intuous A4
Part of a new professional range. Prices range up to £549 (ex VAT) for an A3 pad with pen and mouse.
Computers Unlimited (dealer)
0181 358 5858; www.wacom.de

Wacom Lens Cursor
£50 (ex VAT). A similar item is available from CalComp.
(Contact as above)

Writing on pad for dual input

Pen-driven digitiser pads have yet to take off in the mass market, though they are much used in CAD and graphics studios. Perhaps one reason for this is that a mouse is easier to use for some purposes, so you keep having to swap devices.

Now, Calcomp is offering a **£99 digitiser** *(see column, right)* that comes with a five-button mouse and a two-button pen. Both are cordless, programmable and need no power. If the mouse is sitting on the 5in x 4in Creation Station pad, the pen is disabled. Pro versions come with larger pads, a choice of pens, and a cross-wire mouse with 18 programmable buttons.
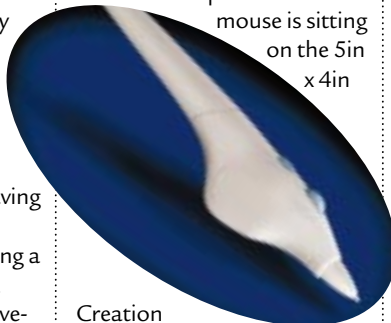
Rival Wacom has launched a new professional **Intuos range** of tablets, including A4 and A6 starting at £129 (ex VAT). Options include a digital airbrush *(pictured, left)* and an inking pen, stroke pen and lens-cursor mouse, all at £50 (ex VAT) each.
CalComp www.calcomp.com;
Wacom www.wacom.de

Sorting out the meaning behind a bunch of fives

Eight European firms are working to establish a best practice for machine speech interfaces like the one in BT's voicemail system. Standards set by the EC-funded DISC program could be used in PCs and speech-operated appliances.

Good recognition is only half the battle, says Cambridge-based Vocalis, one of the DISC companies. Researcher Klaus Fallenschmid says just as important is the dialogue structure and how it is used. Vocalis is also working on mixed-mode systems which take spoken choices from visual menus. Recognition in these systems is much helped by the fact that the context is known. The same goes for machine-reading of forms filled in by hand, a speciality of another Cambridge firm, Neuroscript.
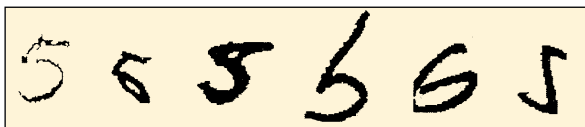
Writing is located using a colour-coded background which is subtracted to isolate the text. Probablistic and neural methods can be used to recognise, say, the various 5s printed above. Phone numbers, names and addresses can be checked with a database of valid forms, with enough precision to support a wide variety of applications: for instance, to read car numbers snapped by police.

Vocalis 01223 846177, www. vocalis.com. Neuroscript 01223 421270, www.neuroscript.com

Christmas resurrection for the Commodore 64

For many, the Commodore 64 dredges up **happy memories** of a bygone age. Now, the cyber-ghost has been resurrected by Netherlands-based Web Computers International, which plans to have Commodore 64s piled high in Dixons stores this Christmas.

The "new" £299 (inc VAT) version is a PC called Web.it which can run C64 software using a software emulation. It uses an AMD 66-100MHz Elan 486 processor, with 16Mb RAM (which is expandable to 32Mb), plus a whopping 16Mb of ROM holding Windows 3.1. In addition, there's IBM's PCDOS 7, Netscape Navigator, Lotus AmiPro WP and Lotus Organizer. A variety of C64 game favourites are bundled.

Like the original C64, everything is inside a single keyboard, with an output to TV. There is also a VGA connector for optional monitor, a floppy drive, and a 56K modem. There is no hard disk, nor for that matter a C64-compatible cartridge port, but there is a connector for a PCMCIA card unit and an infra-red port for an optional wireless keyboard. You don't get a mouse, but there is a laptop-style touchpad instead.

Targetted customers will be first-time buyers with little money. Web Computers says this is the first in a family and that its target is to sell 250,000. This is ambitious indeed when you consider the now infamous Commodore curse. First, Commodore was thrown a lifeline by Escom, which then went belly-up. Next, Gateway 2000 bought the Amiga technology and promptly suffered some bad quarters' financial results. And Web Computers has licensed the name from the present owner, Tulip, which recently almost went bust.

IAN BURLEY

Web Computers International
www.webcomputers.net

GRAPHICS ## Quark attempts Adobe buyout

Adobe's slowing sales and sinking share price tempted its rival, Quark, into an attempted buyout for an unstated premium over the current share price.

Quark claimed that it would "divest" Adobe PageMaker, rival to its own XPress publishing package, to avoid US anti-trust problems. Adobe rejected the bid on the grounds that it was not in the interest of its customers.

Quark, which has a much smaller net income than Adobe, threatened a hostile bid, but as we went to press Wall Street appeared sceptical that the bid would succeed.

Adobe had come to the fore earlier in August when it said that it expected to announce, at best, break-even results or a small third-quarter loss. Co-founder Charles Geschke said Q3 Japanese sales were expected to drop 40 percent.

Alasdair Boyle, Adobe's managing director in the UK, said that sales had slumped partly because there had been a lull in upgrade revenues, although it will be shipping Illustrator 8.0 later this year.

Adobe also unveiled its high-end publishing system, K2, which is trumpeted as a rival to Quark XPress.

GRAHAM LEA

A MicroDrive moment

The disk-drive industry has for ten years been vying to create the **smallest rotating media drive** on the planet. Today's smallest is 2.5in, with the result that most storage for small devices is based on some type of flash RAM which is expensive and tops out at about 50Mb. Now IBM has introduced a MicroDrive, with a rotating disc about the size of a US quarter. It stores 170Mb or 340Mb, measures 1.5in x 2in, and has to be placed in an adapter to work in a PC Card slot.

The new drives comply with the Compact Flash Type II standard and so can be used in any PC Card slot. But you can imagine it being deployed directly into cellular phones and digital cameras.

This is a real breakthrough, tripling the capacity of current flash RAM devices at about half the price. They will not be available until mid 1999, but are bound to make an impact on all types of digital devices.

I have been using an iMac for some time now and I can tell you that this is one sweet computer. It seemed large when I first saw it, but when I pulled mine out of its box, I was struck by the fact that it really is just about the size of a 17in monitor. I would not hesitate to recommend it to anyone seeking a first computer. The early rush is very encouraging for Apple. It pre-sold 150,000 units and I expect that the 400,000 it can produce by the end of September will be sold out. Apple officials think they can have as many as a million shipped to stores by the end of the year, and even that may not meet demand. At least 15 Silicon Valley stores opened at 12:01a.m. on launch day and had a mad rush of buyers. Apple is on a high and its morale is soaring. I'll be interested to see how long it lasts.

Tim Bajarin
letter from Silicon Valley

ETELKA CLARK AND SUSAN PEDERSON REPORT FROM ECTS IN LONDON

Lego CDs click into place

LEGO gave a sneak preview of its range of CD-ROMs for children at ECTS, including three new creativity products that will appear this month.

Lego Creator, which has a suggested retail price of £39.99, gives kids the chance to play with virtual bricks and create complex models. The models can be brought to life and then combined to create entire Lego worlds, complete with sound effects.

Aspiring engineers will get a kick out of Lego Loco, an online train set that comes complete with little Lego commuters to ride the trains and explore the town. Priced at £29.99, the software allows your child to design an entire railway network and manage the signals. If they're on a network, they can send trains to other users.

Fans of Lego's Western and Pirates themes will enjoy Lego Chess, a real-time 3D strategy game that creates a story around the game. In the Western version, the Sheriff pursues a band of outlaws that have robbed the bank, while the pirate version involves a group of sailors in search of buried treasure

▲**LET'S HOPE THAT LEGO LOCO TRAINS RUN ON TIME**

who must outwit pirates along the way. Humorous cartoons are played whenever a piece is taken, and a friendly tutorial is included to help absolute beginners. All the above products are released on 11th November. Lego also previewed some products that will start appearing in the second quarter of next year, including Lego Land, a theme-park design game, and Lego Friends, which will be part of the Lego Software for Girls series.

The REAL Neverending Story continues

The Munich developer Discreet Monsters is preparing to launch an authentic 3D real-time adventure called The REAL Neverending Story. Based on Michael Ende's novel *The Neverending Story*, this game features an intelligent combination of action, suspense and skills, in addition to brain-teasing puzzles and tricky combat situations, building up into a powerful story with captivating special effects.

Starring the dauntless hero Atreyu, the game follows his thrilling encounters with Falcor the luck-dragon, the Rock Biter, and the Childlike Empress in the Ivory Tower. The REAL Neverending Story will be out in early 1999.

Gangsters

Eidos is releasing a real-time strategy game called **Gangsters — Organised Crime**. Due out in October, this game is set in a Chicago-like town in the prohibition days of the twenties. Gangsters is a strategy game where crime definitely pays. From extortion and intimidation to street execution and all-out gang warfare, Gangsters creates a world where you are "da boss" with the power of life and death over those you control. Played in a virtual city populated by over 5,000 individual characters, this game looks like it is set to be one of the most talked-about games this Christmas.

Lara returns in Tomb Raider III

Just when you thought all the Tomb Raider hype had finally died down, Eidos is reviving Lara, the world's most famous cyber-babe. The divine Ms Croft will soon be gracing our computer screens in **Tomb Raider III**.

In a game that surpasses even her own earlier adventures, Lara travels the globe, from the deserts of

Nevada to the islands of the South Pacific. The new game consists of five new levels which can be played in any order, and it has a faster game engine than before. Lara will have new costumes and vehicles, and greater agility.

Tomb Raider III will blast into the shops in November and will be priced at £39.99.

news

Digi videos

Eight in ten camcorders sold are analogue but digital sales are beginning to rise, according to Sony. It hopes its new **DCR-PC1** will reinforce this trend. The PC1 is about the size of a Walkman and boasts an 810,000-pixel sensor, a 2.5in LCD monitor screen, and a 10X optical zoom. The InfoLithium battery lasts a claimed three hours with the LCD screen off. It has a fast i-Link Out, in addition to standard PC and TV outputs. Street price will be about £1,400 (inc VAT).

• **Hitachi will ship** a digital camcorder next year using DVD RAM rather than tape storage, sources say.

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Sony 01932 816000

New SDRAM CATCHES THE BUS

Samsung has developed a memory module holding 1Gb of SDRAM, fast enough for Intel's new 100MHz system bus. The 168-pin DIMM holds 36 250Mbit SDRAM chips stacked in layers and will be used in servers, high-end workstations and video systems. The first should appear early next year.

The 1Gb modules are the second claimed breakthrough by Samsung within a few weeks. Earlier it announced the development of the 64Mbit Rambus memory modules and was ready to begin mass-production. Samples have been shipped to major manufacturers who expect Rambus chips to supersede SDRAM in the next couple of years. Samsung forecasts that its Rambus chips will take half of the world DRAM market: it plans to make up to one million a month by the middle of 1999. World sales are expected to rise from $20.7bn last year to $58bn in 2001, according to analyst, Dataquest. But market researcher Semico forecasts a continuing decline. And Hitachi and Mitsubishi are shutting down fabs in the US because of a DRAM sales slump.

Significantly, Semico says there is a demand for higher-density DIMMs. It forecasts a shakeout of manufacturers, partly due to the difficulty of making fast memory.

ADDITIONAL REPORTING, MIKE MAGEE

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Samsung 0181 391 0168,
samsungelectronics.com

Web searching, the natural way

Web searching is time-consuming and tedious despite the advent of intelligent search engines, so it was interesting to hear Microsoft's Steve Richardson talk in Cambridge about how it can be improved by natural language processing (NLP). Microsoft reckons NLP achieved a three times better hit rate than conventional searches in tests with well-known web search engines.

A team from Microsoft Research, Cambridge, will shortly be taking part in an international competition of text retrieval systems at Washington. "How to increase precision is a hot topic for us," says Richardson, one of some 60 NLP workers based at Redmond, Washington.

Microsoft wants to build an understanding system for unstructured natural-language text in multiple languages. Among its resources is MindNet, a knowledgebase drawn from two dictionaries: the Longman Dictionary of Contemporary English and the American Heritage Dictionary. MindNet analyses the relationships between words and their similarities. "We realised that in MindNet we had...an architecture for processing any text," says Richardson. "If you had the power to take any text and turn it into a structure, an intelligent index for a document database, you had a dynamic repository for a conversational interface."

Workers at Microsoft Research, Cambridge, are also working on the design of electronic books (e-books), which has a long way to go, according to director, Professor Roger Needham. "There are various aspects...What sort of physical display do you hold? How do you protect intellectual property?" The e-book interface is his team's particular concern. "When display technology gets to the point that [you have a device] you can actually put in your breast pocket, we would hope to know how to use it."

Publishers will prefer a special-purpose device with built-in copyright protection but Needham hopes a way can be found around their fears. He asks: "Could you get to a situation when you can buy content and read it on a laptop without the owner of the content feeling it may get distributed further, illegally? This is a mountain with a lot of bones on it."

• **Cambridge company, Tadpole,** doubled its turnover overnight with the takeover of its US competitor RDI for £3.7m, making it the only manufacturer of mobile Unix workstations and servers, worldwide. RDI gives Tadpole a product line which is well accepted in government circles. Tadpole has also just launched its Voyagerlli UltraSPARC-based mobile servers (*pictured above*), with a 20Gb disk and support for up to 1Gb RAM. And its Java-based Cartesia software for screening geographical (GIS) information has recently been released.

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www.research.microsoft.com;
www.tadpole.com; www.geofox.com

TADPOLE'S ULTRASPARC-BASED MOBILE SERVER

Caroline Swift continues her reports from *Silicon Fen*

net news

short stories

➤ **MORE NET, LESS SMILES**
People who use the internet are more likely to experience loneliness and depression, according to a study by Carnegie Mellon University. The study found that people's unhappiness increased in proportion to their internet usage, even if they used email and chat rooms.

➤ **NEWSQUEST MOVES ONLINE**
A regional newspaper group is hoping to make it easier to join a "digital community" by providing internet access for its readers. Newsquest plans to offer unlimited internet access for approximately £75 per year, starting in October. The group is already known for other electronic publishing ventures, such as its This is… local guides.
For more information, call 0171 420 2700 or see www.newsquest.co.uk

➤ **WINDRUSH WEB SITE**
The BBC is celebrating 50 years of black British culture with an online guide to its Windrush documentary series about West Indian emigrants to the UK during the forties and fifties. The web site has a large section on black British writing, including reviews, author biographies and a literary timeline. You can also send electronic postcards of Windrush immigrants or submit your own family photos.
www.bbc.co.uk/education/ windrush

PORTALS

Gateways up for grabs

The internet portal market has started to heat up after many major companies scrambled to establish themselves as **gateways to the web** last month. Yahoo!, Excite and Amazon all sent a direct challenge to traditional internet service providers by announcing a range of new services designed to keep users on their site for longer. An internet portal is a site that combines a number of services, such as a search engine, chat room, shopping section and personalised settings.

Yahoo! launched its Clubs service, which features personalisation tools, email, chat and bulletin boards. The launch followed a similar announcement from the search-engine company Excite, which has also started branching out with a number of major additions to its My Excite personalised web service. The Communities scheme allows users to not only get their own web site, but also to set up special communication facilities between groups of friends, relatives or those with the same special interest. It has additionally launched a free UK email service similar to Microsoft's Hotmail and plans to roll out a much broader selection of content that is tailored to each country.

Online bookshop, Amazon.com, jumped on the bandwagon by buying up an email community networking service and a search-engine company for US$270m. It plans to combine the two services with its own shopping service on one site in order to provide shoppers with a more personalised experience.

Microsoft has decided to get in on the act, too, by announcing that it would be rolling all of its sites into one by the end of this year, most likely under the name of MSN.com, as well as developing its own search engine.

For more information, see:
www.amazon.com
www.excite.co.uk
www.microsoft.com
www.yahoo.co.uk

WRINKLES

Good news for grey-timers

A monthly newspaper catering to the over-50s has moved online. **Mature Tymes** offers a reunion page, competitions, a contact board and holiday information. It also has links to other sites with information on music, science, motoring, technology training and crafts and hobbies. More than 20 percent of people aged 50 and over now own a PC, and the so-called "grey market" is one of the fastest growing age groups on the internet today.

You can find it at www.maturetymes.co.uk.

Good grief, Moncrieff!

A Scottish clan is holding a vote, via the internet, for a **new tartan** as part of its 750th birthday celebrations. It is the first time that a tartan has been democratically elected. The Moncrieffs say their old pink and green plaid is boring and "unsexy" and have called for new design suggestions from clan members around the world. Voting closes on 31st October.
http://ourworld.compuserve.com/homepages/ clanmoncrieff

The XML-files

Clive Akass reports on XML, which enables machines to have meaningful conversations.

TV, computers, desktop-publishing and the web have all at some point been likened in importance to Gutenburg's invention of movable type. Yet Jeremy Verity, senior consultant at Thomson Consulting International, unabashedly makes the same comparison as a measure for the likely impact of XML (eXtended Markup Language), which is set to become the next-generation web *lingua franca*. Gutenberg, he says, ushered in our world by enabling mass publication; XML is ushering in the 21st Century world by enabling the full possibilities of mass interactive communication.

XML certainly has ramifications that go way beyond its roots in the print industry. Like HTML, it is more or less a subset of SGML, the cumbersome but potent mark-up language used largely to generate standard-format publications such as manuals or dictionaries. Like HTML, it is platform neutral, uses undisplayed descriptive tags and is policed by the independent World Wide Web Consortium (or W3C, which released XML version 1.0 in February).

◄ **A GOOD ROUND-UP OF THE SUBJECT BY VERITY'S COLLEAGUE, NEIL BRADLEY. ANY BOOK ON XML IS LIKELY TO RAPIDLY GO OUT OF DATE BUT THIS COVERS V1.0 AND ASSUMES NO KNOWLEDGE OF EITHER SGML OR HTML, ALTHOUGH SOME FAMILIARITY WILL HELP.**
• **£24.95. ADDISON WESLEY. ISBN 0-201-34285-5**

Unlike HTML, it uses meta data (i.e. data about data). Hyperlinks aside, HTML is simple text. XML adds information on the meaning of the text. There are two main types of XML communication: machine to machine, and machine to person. The latter is traditional publication in the broadest sense, and XML offers it significant advances.

As PCW has discovered, adapting documents formatted for print for re-publication on the web can be no small task, particularly if, like most magazines, you design pages using Quark XPress. But documents held in XML format contain all the information needed for their assembly, styling, formatting and publication for any target audience using any medium — including the web. Explorer 4.0 supports XML and so will Navigator 5.0. This is where Thompson Consulting, an offshoot of the publishing house, comes into the picture. Verity is not alone in seeing this type of multi-medium publication as the future of the industry and his company has just launched a module, called Te@ms, for managing digital content.

XML is ushering in the 21st Century world

Machine-to-machine (in effect, program to program) XML is still more intriguing. Because it can include information about data types, it can be used to exchange information between programs, including relational databases. It is also seen as a means of democratising Electronic Data Exchange, currently the domain largely of big businesses using expensive private lines and a tricky encoding scheme. An XML version of this will allow EDI transactions over the internet.

XML is seen as likely to replace not only Rich Text Format (RTF) as the standard platform-neutral word-processor file format, but also CSV and the like as the standard interchange format for databases. Eventually it will allow search engines to become a lot more intelligent. The W3C is developing an XML-based Resource Description Framework (RDF) to support metadata on the web for purposes such as digital libraries and searching. The next version of Microsoft Office uses XML. Verity reckons advanced XML browsers and XML/EDI will be in widespread use next year, and that by 2002, XML will be used in all communicating devices.

CUT YOUR CLOTH TO SUIT YOUR PURPOSE WITH EXTENDED MARKUP LANGUAGE >>

All-purpose XML

XML is easily tailored for specialist uses and has already sprouted a host of application-specific versions. Perhaps the best known is Channel Definition Format (CDF) used for internet push technology, and Synchronized Multimedia Integration Language (SMIL) for synchronised multimedia presentations. Others include Astronomical Markup Language (AML), Bioinformatic Sequence Markup Language (BSML) for genetic engineers, Chemical Markup Language (CML), Classified Ads Format, and the Notes Flat File Format (NFF) interchange format for the Lotus Notes/Domino platform. There's an Open Financial Exchange (OFE) for financial data, and Open Software Description (OSD) for describing software packages for automated distribution. Others cover printed music, maths and real estate.

Back seat driver

If PCs take second place to TV sets, who will be in the driving seat? Clive Akass views the picture.

Computers will take a back seat to TV sets for digital interactivity, according to a new Ovum report. This would appear to have deep implications for the PC industry, but you have to be clear about what is meant by "take a back seat".

The report, *Digital Television: How to survive and make money**, predicts a battle between net access providers and broadcasters for revenue from interactive services which, within five years, will generate an estimated 20 percent of digital broadcasters' income. All will try to keep punters on their patch: net providers by creating fast-access portals to popular services, and broadcasters by creating what Ovum principle consultant John Moroney calls a "walled garden" of compelling content.

Broadcasters would like to block viewers from accessing the net at all, to prevent leakage of revenue, says Moroney. They have no option if they are to remain competitive, so the TV's set-top box (STB) will have an internet port. But a surprising amount of interactivity can be had without it. This is because

web content, including entire sites, can be piggy-backed on to a TV signal. For instance, a TV advertisement may invite viewers to visit the Mercedes web site. Then, a hyperlink connects not to the Mercedes web server but to the STB, instructing it to strip the site from the TV datastream and cache it locally. Only if the viewer decides to buy a car and fills in an on-screen form, need the internet be accessed, and then for only the few seconds it takes to squirt the details to

It will be nerds with PCs who will be pushing at the edges, not couch potatoes with STBs

Mercedes. The form will cover only the goods required and personal details will be collected from a smartcard slotted into the STB.

Maroney predicts that 80 percent of interactivity will take this form. Just 20 percent will occur over the net, which will be used mainly by the kind of people who are already using it, and for much the same reasons. But his perspective is that of the major broadcasters and he assumes that a TV-capable PC will cost around £1,000. Some industry figures are already talking of sub-£500 PCs — not a great deal more than the cost of an early digital receiver. Adaptec and the Korean company Telemann already make digital PC TV cards and the UK manufacturer Pace (a major STB contractor) plans one for next year. Moreover, viewers are unlikely to be content with a walled garden, however compelling the content,

and they will baulk at having to buy different STBs for different services. A PC should offer far more flexibility, controlling access to multiple digital data streams via cable, satellite, terrestrial broadcast, ADSL or whatever. Fronting them can be software that not only acts as a program guide, messaging and news centre but also works out the best paths (balancing cost, speed and quality) for sending or receiving data.

No-one knows how these systems will be used in the long run, but they will be used in ways that no-one has imagined. This innovation will come from below, not from the dictates of media moguls. You can bet your boot-disks that it will be nerds with PCs who will be pushing at the edges, not couch potatoes with STBs. Which is why I'm getting rather fond of Eutelsat, whose Convergence1 Internet service with Easynet I wrote about last month.

This is still a nerd zone, with little content and flaky prototype software demanding obscure parameters (rather like the early web). But Eutelsat is alone among the satellite companies in encouraging experimentation with PCs. I finally managed to get some TV out of Convergence1 (as opposed to Eutelsat's 350 conventional channels) last month: some clips of an IPTV datastream put out by Cisco; a fashion show using the Streamworks player; and Channel 5 via Microsoft's media player (*see picture, left*). All were low frame-rate with poorly-synched sound in small windows, as I had no hard-wired decompression. But it shows what can be done. This is not data being squeezed down narrow web pipes. It is data falling fast from the sky. It means you, too, can become a broadcaster. There is scope here to evolve a new type of broadcasting economy. I'm told it will be possible to get an aerial that receives both SkyDigital and Eutelsat. If Eutelsat plays its cards right and rides the Sky wave, and the trendies of the arts and music worlds spot the possibilities, it could even become fashionable.
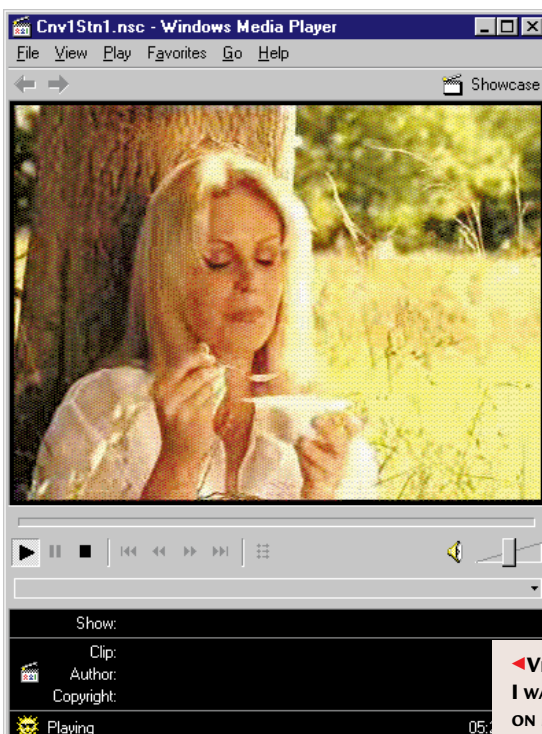
**Available from Ovum, price £1,695.
www.ovum.com*

◄ **Via Eutelsat's Convergence 1, I was able to pick up Channel 5 on my TV set**

SHIPPING NEWS

Third beta delays NT 5.0

Microsoft's unexpected decision to add a third beta to the rollout of Windows NT 5.0 will push back the final shipping date of the product until late next year, according to analysts.

Microsoft originally expected NT 5.0 to ship in the first half of this year. In fact, it began shipping the second beta version of Windows NT 5.0 operating system at the end of August, which will go out to about 200,000 users worldwide.

Microsoft has created a lot of marketing hype but it's not delivering, according to Peter Joseph, a corporate strategist for Novell UK. "We've been pushing out the beta of NetWare 5 and people are suddenly asking, 'why do we have to wait for NT? We don't have to wait for Microsoft's promises'," he said. Although he doesn't see NetWare 5 and NT 5.0 as direct competitors, the window of delay still leaves Novell in a much stronger position. He said, "If you're waiting for the technology and what it's promising, look at what we're offering today." Novell shipped NetWare 5 on schedule in September.

The second beta of NT, which was originally scheduled to ship on 30th June, is believed to contain most of the features of the final version, including directory service software. Microsoft has said it has eliminated most of the main bugs, or showstoppers, in NT 5.0. Simon Moores, chairman of the Windows NT Forum in the UK, expected Microsoft to have worked on simplifying the product. "Microsoft is trying to tighten down the code by removing what it doesn't need. At 30 million lines of code it's still a very big product," he said. Kirsten Ludvigsen, the programme manager for IT market watcher International Data Corporation, thought that users would want to evaluate NT 5.0 before they used it. "That's what any sensible LAN manager would do," she said.

A spokesperson for Microsoft claimed that a delay to the final product was not a foregone conclusion, but said that the longer rollout would mean happier customers in the end.

ADDITIONAL REPORTING BY **PETER BRANTON**, VNU NEWSWIRE

THE LOTUS POSITION

Lotus reveals Organiser 5.0

Lotus has announced details of the next version of its time management software, Lotus Organiser. It is also launching a new campaign to protect its cc:Mail user base.

Lotus Organiser 5.0 will have enhanced contact management features, including support for group scheduling, a simplified user interface, and extended information management capabilities. The upgraded user interface features new views and navigational capabilities, including a calendar navigation toolbar. The product was due out in the US by the end of September, but no UK release date has been announced.

Lotus is also launching a campaign to encourage its cc:Mail users to upgrade to its products. The 14 million user base will be eligible for an upgrade to Lotus cc:Mail Release 8.3 (which shipped in September) or an upgrade to the Lotus cc:Mail multi-mode client and Lotus Domino Server, or an upgrade to Lotus Domino Mail Server with Lotus Notes client. Lotus is counting on the PC version of its eSuite productivity suite to rescue the ailing product after the network computer (NC) version faltered due to poor take-up of the NC itself.

When Lotus originally launched its eSuite, it chose to target the NC thin-client market initially, but the strategy was not as successful as was first hoped for. The personal computer version of eSuite is expected to ship later this autumn.

Lotus eSuite is a Java-based application family which consists of Workplace and Devpack — a Java development kit. Workplace includes email, a spreadsheet, a calendar, chart and presentation graphics, as well as an address book.

PETER BRANTON, VNU NEWSWIRE

PATENTED ADS

A web marketing company has snapped up the rights for the practice of paying internet users to read online advertisements. California-based CyberGold received the US patent for the practice of rewarding online consumers, and plans to license the concept to other online advertising companies. CyberGold stands to gain significant influence over online marketing, because the practice could be applied to the internet, intranets or interactive TV.

SPAM NO MORE

California has taken a decisive lead in internet legislation by banning junk email. Spammers can be sued by internet service providers under the new law, and will face up to $50 in damages for every message they send.

TOMORROW, TODAY

Delve into the weird and the wonderful with the Beeb's new webzine, which showcases the latest happenings in the world of science and science fiction. Tomorrow's World +, which is located at www.twplus.beeb.com, is the place to go if you want to settle a scientific argument, explore the logistics of time travel or simply regale everyone with stories of your close encounter with the Loch Ness monster.

SERVICES

Internet access gets cheaper

The increasingly cut-throat internet access business has got even more competitive with the launch of two new services.

Tia Net is offering unlimited nationwide internet access for £4.90 (ex VAT) per month. Users get 5Mb web space and five POP3 mailboxes, with up to ten aliases for each mailbox. There is no setup fee and a 7-day, 24-hour technical helpline is also available. Each account also comes with a free call-forwarding service, which allows you to forward a designated number to any other phone number in the UK, including mobiles. Free voicemail is also included with the service, allowing the service to call you back with your messages or remind you of appointment details that you've recorded earlier.

Cable and Wireless (C&W) also rolled out its internet access service, which is based on a charge per minute rather than a monthly subscription. A special promotional rate is available for C&W cable telephone customers until the end of November. Until then, customers will pay 45p per hour to access the Internet Lite service, while non-customers will pay normal national call rates. After the trial, C&W customers will pay 1.66p per minute at weekends and 2.5p per minute, while non-C&W customers can use the service for 2.95p per minute.

C&W's Internet Lite service is modelled after AOL's, which provides customers with a variety of services in addition to simple internet access. C&W, however, is selling itself on offering lifetime access with the promise of an email address for life. Members pay a one-off £10 subscription to C&W, and after that, just connection charges.

SUSAN PEDERSON
(ADDITIONAL REPORTING BY VNU NEWSWIRE)

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www.tianet.com.
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Music stores setting up web sites

Traditional music retailers are moving onto the net to match their online competitors. Tower Records announced that it would be setting up a UK-based internet shop for music, books and video in mid-November, while Virgin said that it would be establishing a UK-specific site around Christmas time. The announcements were made shortly after the US-based net music store CDNow launched its European service. Tower Records plans to put over 600,000 entertainment titles online. The service will be available in 150 currencies and will be served by 40 distribution centres worldwide. Customers will be able to check out reviews, audio samples and track listings before buying.

– – – – – – – – – – – – – – – –
Tower Records 01223 880 111,
www.tower.co.uk; Virgin 0800
005003; CDNow www.cdnow.com

Put some Zing! into your internet life

Internet users can now get something to keep them occupied while waiting for web pages to download. Zing! is a free internet application that pops up while a page is downloading and plays song excerpts and jokes, gives mini French and Spanish lessons, and quotes and cartoons. Your download times aren't affected, and you can choose as many different themes as you like from the dozen or so different channels.

– – – – – – – – –
Get your copy of Zing! at
www.zing.com

Micron shows off its winning team

Top US vendor challenges market leaders in a bid for the midde ground.

PC vendor Micron invited me to its first analysts' summit last month. The company is number three direct seller in the US but is way behind Dell and Gateway, and it has pulled in a top-notch management team to push up sales.

Most important was new CEO Joel Kocher, who created Dell's direct sales model and is credited with defining this type of marketing. Joel is what I call a spitfire. He speaks like a southern preacher and is one of the fiercest competitors I've met.

New vice president of commercial business is Scott Bower, a top IBM marketer who is credited with helping make the ThinkPad a success; former Apple marketer Mark Gonzales is VP of world sales and marketing. Behind them are design, manufacturing and supply

teams good enough to make Micron a serious player.

Ten years ago fewer than one in a hundred PCs were sold direct, rather than via a reseller; today, the figure is

Micron has created the Mpower, a form of obsolescence protection: I think it has potential

closer to one in four and the market is growing. This segment of the industry is hot. Market leader Dell has gone for corporates; Gateway focuses on consumers, and both chase the middle ground, the small- and medium-sized businesses. This is where Micron is putting all its efforts. It has created

something called the Mpower, a form of obsolescence protection. This is not the first such scheme but I think it has potential. It has two aspects:

☛ Trade-ins. Other companies have tried this in the past, but usually only with their own makes. Micron will take models from some 13 major vendors; it puts the PCs through a certified green disposal program.

☛ Trade-ups. You can move to a more powerful system after a year. A recent survey found PC obsolescence is a major issue with buyers.

Micron is also challenging the market leaders on bangs per buck. Chief technology officer, Dean Kline, expects it to offer a full 450MHz for under $2,000 (about £1,250) this Christmas and a 600MHz system for the same price next year.

Intel loses out in low-price PC market

Chip-maker takes a wrong turning in the run-up to Christmas.

It is hard to believe that Intel has taken so long to get its act together with its new Celeron chip. In late August, it finally introduced a Celeron with cache to speed up this low-end processor. You may remember that the performance of the first Celerons paled in comparison to chips from AMD and National Semiconductor.

Intel has lost at least 50 percent of the sub-$1,000 market to these competitors over this shortsighted strategy. Last October, I spoke to former Intel president, Andy Grove, about this segment of the market. At the time, Intel did not even have a chip that could be used in the sub-$1,000 PC market segment. I asked him what Intel was going to do about it. His response was that Intel believed people are willing to pay for value and performance, and that Intel was well positioned to take advantage of that trend. Unfortunately for Intel, he was very wrong. Demand for sub-$1,000 PCs

◄ CELERON, MINUS ITS CRUCIAL CACHE, LOST INTEL AT LEAST 50% OF THE SUB-$1,000 MARKET

went through the roof last Christmas and continues to remain strong. Even worse, prices have dropped further. We are starting to see the first sub-$500 systems hit the market. Sure, they are low-speed 200MHz systems, but analysts expect these to get a lot of attention this Christmas.

Intel's prices are still too high to get any of their powerful systems under $1,000. Sources say that the 333MHz Celeron costs vendors close to $200. So, it isn't too surprising, then, that Compaq's new

system with a CeleronA at 333MHz sells for $1,199. This tells me that Intel has no intention of playing in the sub-$500 arena. While it might allow some vendors to price powerful systems at the $999 range by Christmas, Intel still seems willing to give up a large chunk of this market.

I suspect AMD and National will try to exploit this chance to extend their reach, which means we could see 333MHz AMD systems for as low as $799 going into Christmas. Clearly, the PC business is a tough place to be these days. But it's a great time to be a consumer.

Encryption loophole shut

Researchers at IBM and at a Swiss university have developed new encryption technology to safeguard information sent over the internet from even the most skilled computer hackers.

The new method addresses the potential flaws, discovered earlier this summer, in the SSL (secure sockets layer) encryption system used by many web sites to protect information travelling across the internet. IBM says it is aware that, although the loophole is small, it needs to stay one step ahead of hackers to eliminate consumer fears over the security of online transactions, therefore securing the future of ecommerce.

The new technology, called the Cramer-Shoup Cryptosystem, was developed by top mathematicians at IBM's Zurich Research Laboratory in conjunction with the Swiss Federal Institute of Technology. The inventors claim that this effectively closes the back door on so-called active attacks and is unbreakable even to the most aggressive of computer hackers.

Current cryptosystems are based on extremely advanced mathematical problems that are thought to be insoluble and therefore impossible to crack. However, hackers use active attacks which bypass the underlying mathematical problem by sending a series of cleverly constructed messages to a publicly accessible server. A skilled hacker could then decode encrypted messages that pass through the network by analysing the server's pattern of responses to the bogus text. The Cramer-Shoup method blocks these attacks by adding another series of calculations which ensure that the server leaks no information when responding to the bogus text. IBM hopes that by adding this extra security layer, it will further allay any of the fears consumers may have concerning the security of online transactions, which is a major obstacle to the growth of ecommerce across the internet.

IBM plans to incorporate the new systems into a future version of its Vault Registry software, its public key infrastructure product, which allows ecommerce transactions to travel across organisational boundaries in a private and secure manner.

ANGELA SOANE,
VNU NEWSWIRE

Yell Top 10 web sites

Now that the days are getting shorter and the skies are getting drearier, it's the perfect excuse to curl up on the sofa with a nice cup of tea and check out the new

autumn telly season. Toaster at www.toaster.co.uk is a comprehensive electronic programming guide that has television listings for all UK terrestrial, satellite and cable channels. It plans to start offering customised listings as well as custom TV schedules by email. But if this isn't quite cerebral enough, you should head over to The Poetry Society at www.poetrysoc.com. With competitions, news and reviews, it has enough to keep you occupied throughout the long winter months ahead.

1. BBC Science in Action
2. Berghaus www.berghaus.com
3. Lycos Weather
http://weather.lycos.de/weather/gb/gb.asp
4. The Museum of Science & Industry in Manchester www.msim.org.uk
5. The Poetry Society www.poetrysoc.com
6. RAC www.rac.co.uk
7. Scottish Tourist Board
www.holiday.scotland.net
8. Shop Guide www.shopguide.co.uk
9. Toaster www.toaster.co.uk
10. United Kingdom Parliament
www.parliament.uk

▶ GET CONNECTED
BT has launched an online information and communication service for small and medium-sized businesses. The *"BT connect to business"* service includes internet access, web hosting facilities, business content and email for £12 per month (ex VAT) for a single dialup

licence, and £75 per month for the networked version. *BT connect to business* also lets users send and receive their email, voicemail and faxes over the net from anywhere in the world. For a further fee, they can upgrade to a premium content service.
More information: phone 0800 800800, www.btconnect.bt.co

▶ I LIKE IT, BUT…
Home internet users are getting online because of curiosity and peer group pressure, according to a study by research company INTECO. Although users also want email and the ability to work from home, the study found that most of them didn't really have a pressing need to get online. Most users appreciated the net but could not identify a critical application for it.

▶ THEMAIL IS FREEMAIL
You can pick up a free email-only account complete with connection from "themail". The service, which is funded by text banner ads and selected marketing emails, only requires you to install a web browser on your PC and call a special local call rate phone number for access.
More information: phone 01424 830900, www.themail.co.uk

Action space game to be sold via shareware

A new game, called **Robosaurs Versus The Space Bastards**, caught my eye this month. Not oly because of the outlandish title, but also its superb gameplay. This platform game lets you choose from characters that are based on certain famous action-film actors. Robosaurs will not be published in the traditional manner. Instead, its producer, Krusher Productions, plans to sell it exclusively through the shareware model as perfected by iD software with Doom. Take a look at the web site at www.spacebastards.com — but we do stress that this site is for adults only.

Have you ever wanted to come face to face with disaster? With **Emergency**, the new game from ASCII Entertainment, you can do just that. This real-time strategy game will have you coping with disasters at every turn. It is your job to co-ordinate the activities of the full range of emergency services: fire, police and allied emergency rescue — all within a budget. You are given a mission, which could be a raging forest fire, a plane crash or a nuclear power-plant meltdown. But if you get it wrong, people will die. Don't miss our full review in next month's issue.

Mindscape, the publisher of those cute little Norns, in Creatures, is now launching **Creatures 2**. The follow-up to the artificial-life software which has sold over 500,000 copies, takes A-life technology several stages further. To find out how Creatures 2 is different to the original, read the *PCW* review in next month's *Screenplay* section.

Europress is offering an amazing deal. **Total Insanity 2** gives gamers the chance to pick up Worms 2, Star Trek Generations and Titanic - Adventure Out of Time for an all-in price of just £29.99. For more information, call Europress on 01625 855000.

Act now to enter a nationwide quest for the undisputed **Quake II champion**. If you are aged 18 or over, register and play online via Wireplay's **Quakeadelica** web site this September at www.quakeadelica.com.

ETELKA CLARK

People watching people on WebCams is all the rage. Sad or what, says Michael Hewitt.

Who are you looking at?

Watching paint dry used to be the generally accepted benchmark against which to measure relative degrees of boredom. Today, however, now that the introduction of Dulux Vinyl Silk has, if not exactly rendered the experience truly exciting, then at least introduced into it an element of suspense, we need a new yardstick. Thanks to the internet, I believe we may have one: watching life as viewed through a WebCam.

Two distinct WebCam *oeuvres* have emerged. In the first, the camera shows 24-hour coverage of something reasonably immobile, like a piece of scenery or a city skyline. In the second, the WebCam is mounted in a living room or bedroom and records whatever, if anything, goes on in front of it during the course of a day. The first falls down because of the current limitations of the technology. The concept is sound enough — people do like looking at spectacular views and will often spend hours at it — but it manifestly fails when combined with the internet because computers cannot deliver the requisite breathtaking vistas. Take, for instance, a WebCam I have come across which displays the Manhattan skyline. In real life, this is probably one of the most spectacular sights in the world. However, reduce it to a gimpy 3in x2in image in the corner of a VGA monitor and, unless a meteorite suddenly descends, or a largish prehistoric lizard turns up to eat a few of the inhabitants, you may as well be looking at East Croydon.

The second type of WebCam coverage, the fly-on-the-wall variety is, I fear, a far more worrying trend. In days of yore, if you had very little life to speak of, and that little you did have was of such stultifying tedium that, in comparison, 24 hours stuck in a lift with a Jehovah's Witness provoked a major adrenaline rush, there were just two options: either keep it to yourself, or write a column about it for *The Independent on Sunday*. Now, though, such people are sticking little cameras on top of their computer monitors and broadcasting their sorry existence to the rest of humanity. And, I am afraid, the rest of humanity, or at least a good proportion of the 80 million of them connected to the internet, is eagerly tuning in.

The person who started this nonsense, a 20-something American designer called Jennifer Ringley, proclaimed her "Jennicam" project to be an example of performance art. Maybe. It is also an opportunity for teenagers to log on to her site and watch her undress before she takes a shower or goes to bed. They could, of course, log on to the Penthouse or Hustler web pages and cop a view of some slightly more aesthetically packaged bodies, but that's by the by.

Whatever, Ringley has inspired a host of imitators. Today, it seems that there are few human activities which are not viewable via the net: birth, eating, sleeping, marriage and root-canal surgery, to cite but a small number. It was even reported a few weeks ago that a couple intended to lose their virginity on the internet. This turned out to be a publicity stunt, but I've no doubt that it will come. But when it does, it will be boring. Real life is generally boring. At least from an onlooker's point of view. That's why, whenever they make a film starring, say, Bruce Willis, they always have him blowing up an asteroid with a nuclear bomb or kicking Alan Rickman from the top of a skyscraper,

> **Today, it seems that there are few human ACTIVITIES WHICH ARE NOT VIEWABLE via the net: birth, eating, sleeping, marriage and root canal surgery, to cite but a small number**

rather than just showing him doing nothing but sipping coffee or undressing before he goes to bed.

It's this infantile need that many people have, to scream "Look at me! Look at what I'm doing!", to whom these fly-on-the-wall WebCams are pandering. It is the same exhibitionist urge which prompts people to jump up and down, waving "Hello Mum!" placards behind John McCririck whenever he performs his horse-racing commentaries. It is the same inner demon that drives people to appear on television's Stars In Their Eyes and send obviously staged videos in to You've Been Framed. It's pathetic. But then again, these online antics do, for the time being at least, spare us the sight of one thing which would definitely be more boring — a WebCam view of paint drying. Give them time, though, give them time.

Mike.hewitt@mjh1.demon.co.uk

The shortcomings of Windows 98 may cause the cash cow of upgrades to dry up, says Barry Fox.

Watershed 98

If you could see me now, you'd see a happy man. A man who finally got rid of Windows 98 and went back to Windows 95. It wasn't easy, because my original upgrade had chewed up all my Windows 95 settings and spat them out, leaving me with the need to re-install everything from scratch. But it's been worth it. Things that stopped working when Windows 98 got hold of them now work again. Well, most of them. My RealMagic MPEG-1 decoder seems to have died with the shock of it all, and as Sigma no longer has any visible interest in the UK market, it's probably a write off. But that's a small price to pay for a 98-free life.

Since writing about the problems of upgrading a working PC from Windows 95 to 98 I have received a steady stream of calls and emails, all with a common theme of miserable frustration, cold panic and wasted working time. Writes Peter Allison: "Glad to read I'm not the only one with Win98 problems, as Microsoft might have me believe. System crashed on setup…after five hours on the phone Microsoft told me it was due to FAT on hard disk being partially converted to FAT32 … Luckily I've two hard disks and it only affected one."

"You are not alone!" writes the IT Manager for the London Symphony Orchestra. "Your experience mirrors mine exactly — I spent a week trying to upgrade from 95. Having eventually installed it, my computer has never been the same. Thankfully I just tested 98 on my home PC. It will be a long time before I let it go anywhere near the LSO."

"I have had exactly the same problems, only until now, I didn't know why recovery didn't take place," says Norman Wollons. "I lost the machine for a week, while I got drivers for my CD-ROM, and with DOS book in hand, wrote config.sys entries to make the CD work under DOS. It took a further couple of weeks to get the system something like back to normal."

Meanwhile, PC World, part of The Dixons Group, has agreed to subsidise customers who bought Windows 98 with a DVD-ROM drive, in the misguided belief that the PC would then play DVD movie discs. Those who can prove they were misled will get around 50% off the price of a graphics card that works with MPEG-2 decoder software. But this offer came only after I had pulled rank as a journalist and complained to the Advertising Standards Authority. And even then I had to ask PC World to tell me about the offer. The ASA is satisfied that PC World is no longer misleading the public. But weeks later, Microsoft's web site was still promising that "with Windows 98 you can watch a full-length movie". I have asked the ASA to look at this, too.

So what does Microsoft have to say about all this? In June, when I first started to uncover problems with Windows 98, Anne Mitchard, Marketing Manager for the Personal Systems group and Microsoft's frequent spokesperson on Windows 98, ignored my questions until prodded from other quarters. She finally called me on the 8th of July and promised to get back with a considered comment on my core question: how could Microsoft release Windows 98 with so many inherent problems already well known to Microsoft's own technicians — for example, the risk of the upgrade fatally crashing during conversion of the Windows 95 registry? By my deadline for this column, near the end of August, despite two faxed reminders, I had still heard nothing from Anne Mitchard. Although it will be no short-term consolation to those

The Windows 98 débacle could prove a watershed. By never saying sorry, Microsoft gives PC users, both personal and corporate, THE STRENGTH TO SAY NO to each next upgrade

who are struggling to make things work or staring at a Blue Screen of Death, the long-term future looks good.

Until now PC users have been carried along by the insidious brainwash that constant upgrading is essential. New software has needed more disc space, memory and processor speed. Often the benefits have been marginal, but the vicious circle of hardware-software interdependence has generated a vital revenue stream for Intel and Microsoft. The Windows 98 débacle could, however, prove a watershed. By ducking comment and never saying sorry, Microsoft finally gives PC users, both personal and corporate, the strength to say no to each next upgrade. In the crazy computer industry, big companies' fortunes can change with extraordinary speed. Windows 98 could make Microsoft next.

100131.201@compuserve.com

Holographic data storage is in the pipeline, and Brian Clegg foresees the end of the magnetic disk.

The future is crystal clear

Home users with a modern PC on their desk have it cushy when it comes to disk space. Okay, you can never have too much storage; but even with the disk-eating capabilities of a modern game, the 5Gb-plus that you'll find in a decent machine will last a while. Businesses have a harder time of it. Not only is the average corporate PC less well specified, there is a whole hierarchy of storage with which to cope. There is the local storage on the PC, storage for the networks and storage for the mainframes — and all of them are feeling the pinch.

Until recently, the only options have been magnetic. Either you kept the information on a hard disk, backed it up to floppy (given infinite time) or used some form of tape. But now, the optical revolution is taking place. The recordable CD-ROM is fairly commonplace. Drives are cheap and the disks themselves are affordable. Yet the capacity, while impressive compared with a diskette, is limited. Thankfully, DVD has arrived — or has it? When DVD was first specified, it seemed a wonderful idea. Unfortunately, bickering among the members of the consortium and the inability to settle on a clear standard has left the whole DVD format in a risky state. Few businesses are yet prepared to go down that route. Should you go with the original read/write standard, DVD-RAM, or the breakaway Sony/Philips offering, DVD+RW? In either case, while DVD will provide a great backup and distribution medium once the squabbling is over, it is no replacement for the hard disk. It is simply not fast enough. Recognising that the ability to cram hard-disk capacity into a small space will run out as the manufacturers reach the limitations of magnetic domains, there is frantic research being carried out to find the next generation of storage. Business waits with baited breath. PC hard disks might be big these days, but serious databases measure their capacity in terrabytes (one million megabytes is one Tb).

The best bet for the future would seem to be holographic storage. In this experimental technology, data is stored on a crystal, using lasers — exactly the same interference-pattern approach as is used for 3D holographic pictures. The technical problems are significant, though. The accuracy of the laser positioning and the sensitivity of the material used to recapture the data correctly is a nightmare. But once these problems are overcome, the data centre managers will be dancing in the street.

A holographic store could reach transfer rates of 100Mbps, because it can pull a huge chunk of data out at one time. The compactness of the storage means that it would be quite feasible to pack 2Tb into the same space as one of today's PC hard disks. Data will not be lost because of moving parts breaking down. In fact, the crystal itself should be able to sustain a fair amount of damage before any data is lost. This Star Trek technology may not be too far away, either. IBM, at the forefront of holographic-storage research, believes it should be commercially viable in less than ten years' time. It's a case of don't hold your breath, but the end may be in sight for our old friend, the magnetic disk.

● **A while ago, I mentioned a problem** I had experienced with an ISP. Here's another salutary tale.

> The compactness of the storage means that it would be **QUITE FEASIBLE TO PACK 2Tb INTO THE SAME SPACE AS ONE** of today's PC hard disks. Data will not be lost because of moving parts breaking down

Like most businesses I have my own internet domain, which I use for my email address. But I access the net via an ISP, so my outgoing mail goes through the ISP's server. Recently, for a whole week until I noticed, all my outgoing mail disappeared. The ISP had decided (without bothering to tell anyone) to send any outgoing mail that wasn't from one of their mail addresses into a black hole. When I complained, they pointed me to an alternative server. It seems incredible that a company can take an action that makes mail disappear, without telling anyone. It was claimed that this was for security reasons (which is why I'm not naming names) but anyone who uses a different outgoing mail address ought to be regularly checking that the mail gets through. You never know when you will be next!

Brian@cul.co.uk

Apparently, if you spend more than one hour a week online, you're a geek. Too right, says Paul Smith.

Sad, but true

Recent scientific tests have shown conclusively that I am a sad geek. A huge international study of online usage has proven, beyond a reasonable doubt , that I — in common, I must add, with everyone else online — have no life.

Apparently, spend more than one hour a week online, and you start to lose friends (*friend [n]: a person known well to another and regarded with liking, affection, and loyalty*). Now, this comes as something of a surprise to me, as I have always thought of myself as rather a happy geek, as any of my IRC mates will confirm. I am happily — nay, delightfully — married to Del, although admittedly she was chosen on the somewhat spurious grounds that her name sounded oddly comforting. (I was seeing a woman called Compack at the time so, of course, it could have been worse.)

My circle of close friends does not end there, though. Oh no, far from it. Because, of course, there is also Edward. He is a dear and loving soulmate, whose capacity for warm affection is outshone only by his importunate need for feeding (but that is a common cat thing and I can't argue with it). I also have another friend and his name is Sean, and he really is sad. But that's another story.

So, having comprehensively torn down the fallacious conclusions of this (ha!) "study", I will now turn to the provenance of its shortcomings. And, yes, the eagle-eyed reader will have noticed that I have mentioned its damning methodological flaw already: it looked at those who spend "one hour a week online". Of course, now that I have spelt it out, you will find it risible, but I must say it is shocking to find yet another example of supposedly intelligent people spouting off on a subject about which they clearly know nothing. It is obvious: you cannot spend just one hour online per week. It is ridiculous. It is preposterous. It is, as a geek would probably tell you, "too fine a level of granularity".

What they probably meant to say, these so-called scientists in their fancy white coats with their pocket protectors attached incorrectly, is that they were studying sessions of more than one hour each. For, email blinking aside, it is impossible to be online much

less than an hour at a time. Anyone who purports to do so is just not doing it properly. And the vain boast "Well, I have got a T1 line and can get everything done in a flash" cuts no mustard around here, mate. As everyone knows, faster connections to the internet do not less time online make. They just mean you get more done.

Rather late in my life I have discovered, to the united cheers of British Telecom shareholders everywhere, another net-based time and money displacement activity: online gaming. I missed the whole networked Doom thing because, frankly, mindlessly shooting aliens held no appeal for me. However, I have recently been "reviewing" — and I use that word in case Del reads this — a game called Tom Clancy's Rainbow Six, about leading a counter-terrorist team in various situations. It is simply brilliant and just sucks great chasms out of my time-space continuum. The one problem with it is that both the computer-controlled "tangoes", as we TC pros call them, and many of my own troops, are suicidally moronic.

I need real people controlling them. Hop over to the (free) Internet Gaming Zone and you can get all the

> **Email blinking aside, it's impossible to be online MUCH LESS THAN AN HOUR AT A TIME. Anyone who purports to do so just isn't doing it properly. It's too fine a level of granularity**

real people you need. It is dead simple to join games. Just choose a game, and that game's host will launch the game on your PC and you're in. It is *soooo* cool! And, despite being in the far-flung UK and possessor of a bandwidth-challenged dialup connection, I have no latency problems whatsoever.

All this adds up to whacking great phone bills. I am still awaiting a response from British Telecom about my 0.5p a minute at all times Friends & Family ISP proposal, and I am off now to the launch of its Home Highway ISDN-for-everyone launch to see whether that will be any cheaper — or at least free to journalists. And all this as I wait to be asked to join the West London ADSL trial. Now, with so much excitement going on in my life, who dares call me sad?

www.paulsmith.com

letters

LETTER OF THE MONTH

Net Loss

Demon Internet and now Virgin Net have largely succeeded due to low price and the necessity for you to get your own content on the web. Frankly, they could put information on how to watch paint dry on their own servers as far as I care. I can watch BBC TV (for which I already pay £91.50 a year) to get the news, weather and share prices, or I can switch on the radio. I can read newspapers at between 30p and 50p a day and magazines of any description for up to a fiver a month. In short, there is nothing, based on an ISP's own content, worth inflating my phone bill for. As long as it has information on re-configuration in case I change my email package, or something fundamental about my connection method, or a damn good 24-hour helpline, that is all I need.

PCW replies > Our October Reliability Survey indicated that PCW readers agree with you, Kenneth: content-free ISPs are their preferred choice. We hope you enjoy viewing web sites and avoiding any unique ISP content with your star prize of a Taxan 17in monitor.

KENNETH HENRY kennethh@netcomuk.co.uk

NOTE: Many thanks to everyone who has written to us with their comments on the new-look *PCW*. The postbags have literally been overflowing, but please keep your feedback coming. If you have any strong feelings, good or bad, about our new look, don't hesitate to contact us at newlook@pcw.co.uk.

SILLY BURGLARS

I liked your review of CyberAngel 2.0 (*Reviews, PCW September*) but a fundamental problem springs to mind. If a "sensible" burglar were to reformat the hard disk and install the umpteenth copy of Windows 95 off a bootleg CD before selling it on, where would that leave CyberAngel?

NICKY BIANCHI
bianchi@orbit.net.mt

Conspiracy Theory

With the significant advances in hardware performance over the years, software applications should now perform at the speed of light. But thanks to Windows, this is sadly not the case. Perhaps the hardware and software manufacturers are actively or passively in league here? After all, nothing perks up the sales of hard disks, memory chips and application-software upgrades quite like the latest Windows release. A slim Windows-compatible OS, including all the best Windows features present and past but abandoning the increasing amount of dross and bloat, and enabling all of us to work faster and cheaper... now that would certainly attract my attention and my money.

RICHARD BROWNING wintonhouse@clara.nt

PCW replies > Hang on, wouldn't Windows CE fit the bill? Just imagine, a Windows 95 lookalike, complete with the pocket Office applications running adequately on a PC spec of yesteryear. It's probably understandable that Microsoft isn't keen to dish out an Intel version on floppies for us to try.

MAC THE KNIFE

I am a Mac user. When a friend gave me a copy of your magazine with a review of Apple's new G3 PowerBook (*September*) I prepared myself for the worst. I would, however, like to thank you for an outstandingly refreshing, open and honest review. I avidly buy the two major Mac magazines, and, I am afraid to say, I doubt I will ever read a fair review like that about one of the "opposition's" products. Thank you again!

STEVEN
s.william@ndirect.co.uk

Damn Yankees

As an English computer user I am becoming more and more frustrated with the IT world. Granted, the internet started in the United States and Microsoft is American, but I still don't think that the way we are treated by these companies is at all fair. We always get the latest software far later than in the US, whether it be games or simple software patches or fixes. AOL conducts general maintenance of its systems periodically, and this involves a certain amount of downtime of systems such as mail or perhaps chat and so on. However, AOL does not wish to inconvenience its American customers, so it performs this maintenance during the night, in US time zones. Unfortunately for anyone living outside the "Land of Opportunity", this occurs smack bang in the middle of the daytime. But of course, AOL does not try to develop a way of making things better by developing a parallel mail server to take over during such operations.

ANTHONY MITCHELL Anton25@aol.com

Jonathan Bulkeley, md of AOL, replies >
Upgrades and maintenance are essential to ensure that AOL provides the best possible service to members worldwide. As the servers are located in the US, the majority of work must be carried out there, but we always try to minimise the disruption through careful scheduling. However, in looking for ways to reduce any inconvenience to members, we adopted a new policy earlier this year of rolling maintenance and upgrade work. This means that instead of all members being unable to access a particular service, only a small percentage (for example, generally around five percent for mail) is affected by the work and this tends to be for shorter periods than previously. This move has been welcomed by members in the UK and across Europe.

SHOOT THE ROUTER

Gary Wooding's letter about automatic routing on switchboards (*PCW October*) is spot on. However, he does not mention the most annoying feature of all. When you use a cordless phone with the keypad built into the handset, the call is a continuous pantomime of holding the receiver to your ear to hear what's required — thus missing the chance to press the keys for what you need — alternating with holding the receiver in front of you to press the buttons so you can't hear the recorded message, and you fail to do what's necessary. The upshot is you have to go through the whole thing two or three times as a rehearsal in order to get it right.

JOHN DEAN
john-dean@msn.com

…letters

Top Tip

Most people I know have problems with their mouse after a few months. Invariably, the rollers have become caked with dirt, impairing the mechanism and leading to jerky, imprecise movements. I recommend using a shiny-surfaced mouse mat which is occasionally cleaned with furniture polish. It makes the mouse smoother to use and prolongs the interval between cleaning.

GRAHAM DERRICK
gderrick-alderhey@mail.u-net.com

The Email of the Species

Why do organisations publish email addresses if they don't use them? I recently moved house and sent out change of address notices to all the relevant organisations that published an email address. The response? A certain mobile-phone network kept sending bills to my old address. When I rang and told them that I had informed them by email of my move, their response was: "We don't check email, another department does that". A large motoring magazine: "Oh, someone else in the parent company must have picked up that message, it's up to them whether they forward it to us." Yet another: "An email address for the membership department! What is it?" So, if you have an important message to send, don't do it by email!

DAVID BARON dpbaron@hotmail.com

Microsoft software for the over-fives

Following John Skinner's letter (*PCW October*) regarding the sale and use of Microsoft products, I have a couple of points. Anyone aged five years or over in full or part-time education at a DfEE registered educational institution is eligible to purchase the software. You will need to have your coupon verified by your school or college before Microsoft will ship the software to you, though. Subject to school offices being closed during holiday periods, there is no other reason why existing students should not be able to obtain the software before starting university or college. With regard to the disappointment expressed that very little, if any, paperwork comes with edu-pack software, take heart, John. Even the full retail Microsoft products come with very little paper-based documentation nowadays, such is the extent and perceived benefits of online help/documentation. Visual C++, for instance, has not shipped with a full set of "free" paper manuals since v1.5 in 1993.

NIGEL MELLOR nigel@osdltd.demon.co.uk

Irreconcilable Differences

I cannot believe you have the gall… the pure and irresponsible lack of concern for your readers. I loaded your cover-mounted CD-ROM, quickly browsed through the items, and just as I was about to close down I noticed under "Audio" a header called "Rave eJay". I installed it. Well, you will soon be getting a letter from my wife, and possibly her solicitor, headed "Failure to Meet Marital Commitments". And one from my neighbours for the noise level. I can't stop myself… I'm changing career to become a full-time mixer.

ROBERT PANDORAS
@breathe.co.uk

Laughing All the Way to the Bank

Regarding Mr Wong's letter (*PCW September*), connection costs in the UK are not just bad compared to the US, which, with its 200 million population, can be expected to be far more competitive, but they're also terrible compared to Australia with its 18 million population and a couple of phone companies. You can get connected for about AU$30 per month (about £12.50) and, aside from the 30c *only* local call fee to dial in, that's the end of the bill-paying. The range of ISPs provide everything, from pay-as-you-go to unlimited time/data downloads for this price. Since having moved to the UK, I've been shocked at how expensive it is to connect here, and at the poor speed and service of the UK's (London) ISPs. Why is it so expensive? What "extra" service is provided?

Whatever happened to the great cable revolution that was going to deliver ISDN-speed data lines, along with great cable TV and phone lines, to every home? How do the phone companies justify charging per minute when the population of users is so much larger and the technology is generally at such a low level?

TONI S tonis@dircon.co.uk

CLIVE AKASS *replies > BT may offer us xDSL connections at 1Mbit/sec next year, albeit at premium rates. Cable companies got bogged down trying to flog entertainment in the satellite-dominated UK market (cable rules satellite in the US, where most of them originated). There has been a big shakeout in the cable world this year and, with competition from digital broadcasting, you can expect changes to occur thick and fast over the coming months. The hope is that this will bring prices down, too.*

gadgets

Silver Machine

While other manufacturers continue to produce ever larger and more vulgar speakers, Sony has done its usual trick of outclassing all of them. The SRS-Z1000PC speakers are small but superbly made. They're clad in a weighty metal housing, and the drive units look like mini versions of real hi-fi speakers. They've got two inputs, so you can hook up your computer and your hi-fi at the same time. The lack of a subwoofer is made up for by the sheer quality of the drive units.

Price £147 (£125 ex VAT)
Contact Sony 0990 424424

Back to the Future

Look familiar? Everyone loves retro, but this is an oldie with a new twist. Psion's series 3a/3c design has been given a new lease of life with a sexier finish and beefier processor, plus a fab new name, the, er, Series 3mx. Our initial reaction was "but it's only got two megs of memory!" A Windows CE machine we saw recently had 10 times that. But who needs 20Mb in a PDA? Nobody, that's who, except maybe mad people.

Price £269.95 (£230 ex VAT)
Contact Psion 0990 143050
www.psion.com
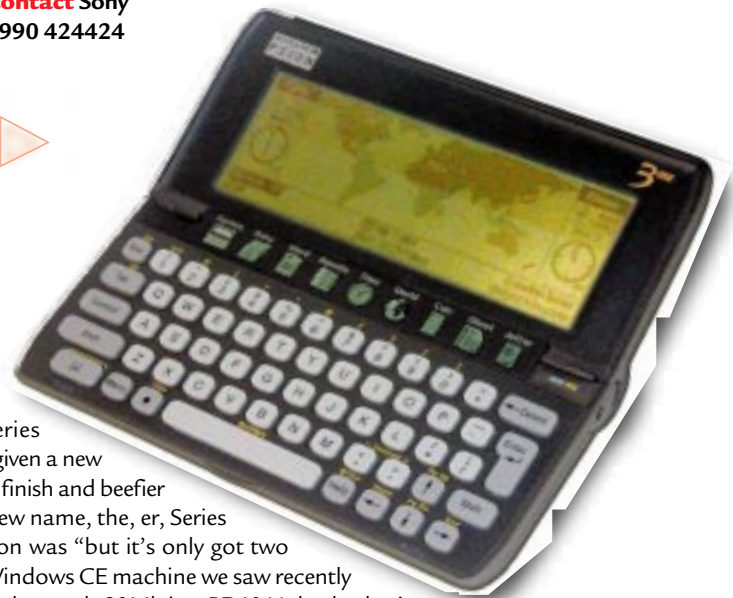
Blue Condition

Cor! In our opinion, a boring-old server has absolutely no business looking this sexy. For that's what it is — the CobaltMicro Qube is a Pentium 200, designed as a basic small business internet/intranet and email server for installation with the minimum of fuss. But that means it's liable to be shoved in a corner and forgotten about, which would be verging on criminal. The little sweetie's less than a foot square, so we'd be tempted just to stick it on a shelf and look at it. Full review next month.

Price From £935 (£795 ex VAT)
Contact Mintra 0161 256 4030
www.cobaltmicro.com

Digit(al) Joy

Question: how many buttons and switches are there on a Gravis Xterminator gamepad? Answer: loads, but we kept losing count. "Festooned" is a word that springs to mind — with buttons, that is. And a proper analogue stick, and a throttle slider, and two analogue flippers. Plus about a hundred more widdly bits. Review on page 98.

Price £39.95 (£34 ex VAT)
Contact Gravis 0800 252359 www.gravis.com
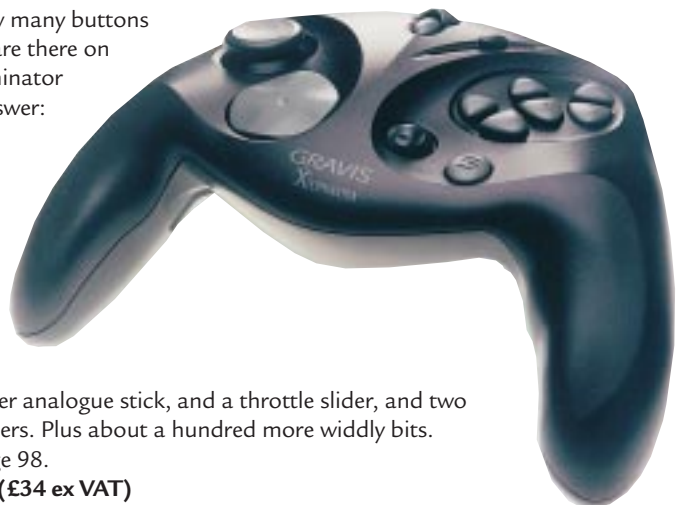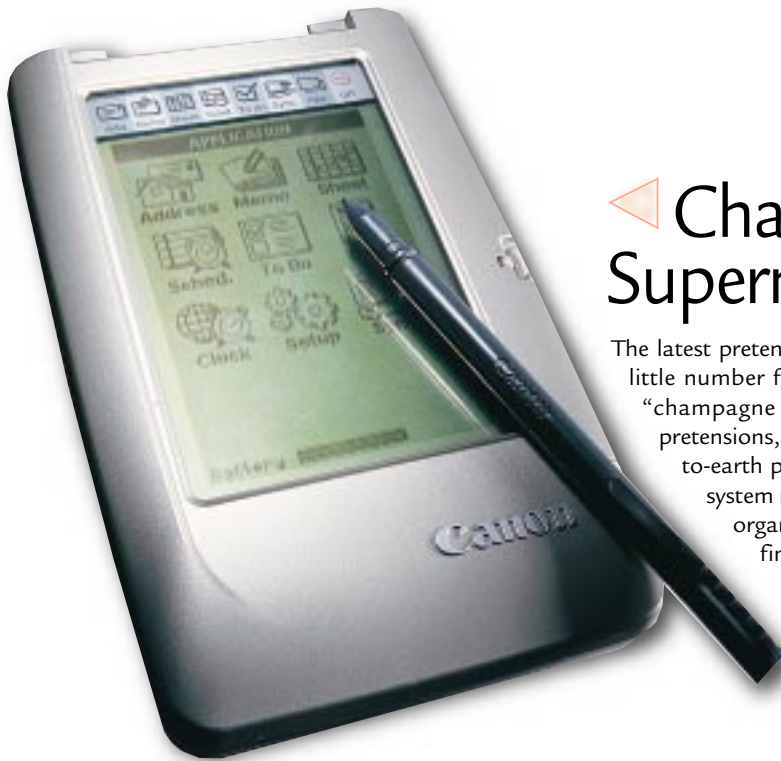
Champagne Supernova

The latest pretender attempting to wrest Psion's PDA crown is this little number from Canon. The colour is officially described as "champagne gold" — 'nuff said. But despite its high-society pretensions, it's a good-old East End lad at heart with a down-to-earth price, running as it does on Canon's own operating system rather than Windows Palm CE. This puts it into the organiser rather than palmtop-computer league, which is fine if that's all you want from your handheld.

Price **£150 (£128 ex VAT)**
Contact **Canon 0181 451 6600**
www.canon.co.uk

The White Stuff ▷

Despite the fact that the internet's bandwidth is decreasing rather than improving, companies continue to try and tell us that internet video cameras are a Good Idea. At least Logitech has put some flair into the design of the QuickCam Home. It's pushing the camera not as an internet videoconferencing tool, but as a means of sending "video email", and has done some clever things with compression and such-like to reduce file sizes. Who knows, it could catch on.

Price **TBC** **Contact** **Logitech 0181 308 6582** **www.logitech.com**

Kids' Stuff

If, like one particular member of *PCW*'s editorial team, you spent your entire childhood sitting cross-legged in front of an enormous box of plastic building bricks absorbed with constructing an even bigger car/spaceship/robot than the last one, this will make your day. Merge the sad hobby of your childhood, i.e. Lego, with the sad hobby of your adulthood, i.e. computers, and *vóilà*! You have Lego Mindstorms, the best reason yet to find a partner and produce sprogs. Review on page 92.

Price **£160 (£136 ex VAT)**
Contact **Lego 0845 606 2043**
www.legomindstorms.com

Filmtastic ▷

More retro! Only this time it's unintentional, we think. The Panasonic DVD-L10 is a bang-up-to-date portable DVD movie player. Only it looks just like CD players from the time when TV presenters were unaccountably spreading peanut butter on the discs and trying to convince us that this was a real advantage of the format. But whatever, it's so hip and happening and now and trendy that our esteemed Editor himself has deigned to review it on page 91.

Price **£999 (£850 ex VAT)**
Contact **Panasonic 0990 357357**
www.panasonic.co.uk

reviews

One of the major pieces of hardware news this month is the release of **APPLE'S iMAC**. There's been a huge amount of interest in it since its announcement, so we've been giving it the once-over. You'll find our verdict opposite. On the PC side of things, **PACKARD BELL** is going for the throat of the high-street computer market with its new offering. On the **TECHNO-WIDGET** front, we've got one revamped and one brand-new **PDA** for those who still haven't taken the palmtop plunge. And for those with more money than they know what to do with, **PANASONIC'S PORTABLE DVD VIDEO PLAYER** will lighten your wallet by a few pounds. Continuing with the video theme, **IOMEGA'S BUZ** gets our thumbs-up. The tidal wave of **NEW FLATPANELS** continues apace, with 15in and 18in offerings from two of the major names in monitors. There's a **FINANCIAL FLAVOUR** to our software reviews, with a couple of tax and accounting packages — an area where a PC can be a godsend. On the fun side, there's a great piece of **PDA SOFTWARE** that'll interest you if you're a Londoner.

DAVID FEARON, *REVIEWS* EDITOR
david_fearon@vnu.co.uk

VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and for the most part are based around industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the Sysmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Contents

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Apple iMac
Different by design

Cool-blue, translucent and compact. As an object of desire, the iMac scores highly inside and out.

"**A**pple forgot how to be different." That was one Apple executive's recent explanation for all the problems Apple has been through in the last couple of years. Well, it may not be perfect, but the iMac certainly is different. From the cool-blue translucent case to the tips of its translucent cables, the iMac boasts one of the most eye-catching designs that the personal computer industry has ever seen. You notice the main case first, of course, but a closer look reveals that the mouse is translucent as well, as are the keycaps on the keyboard.

The iMac is an utterly desirable object of technolust, no doubt about it. The surprising thing about it is that its insides are just as impressive as the outside. It's a compact all-in-one unit that houses both the main motherboard and the 15in monitor. The iMac is aimed primarily at the consumer and education markets, so a compact and simple design was one of Apple's main design aims.

All the cables feed into a small panel on the right-hand side of the unit. Pull the panel down and you can also see one of the system's main innovations. It has no parallel or serial ports, or specific connectors for the keyboard and mouse: all its expansion options are provided by two USB ports. The keyboard connects to one of the ports and also acts as a hub that allows you to connect additional USB peripherals such as the mouse, digital cameras, scanners or external storage devices.

The only other connections with the outside world are the built-in 56K modem and the 100Mbit Ethernet interface. These two features add to the iMac's value for money but they also bring us to one of its weaknesses: the machine has no floppy-disk drive. The

"i" in iMac stands for internet, and the people at Apple seem to think that's how we can send all our files and documents to other people. That's nonsense, of course, especially here in Europe where higher phone bills mean that fewer people use the internet than in the US. However, Newer Technology will be producing an external floppy-disk drive, and Imation plans a USB version of its 120Mb SuperDisk drive. Many of the big players are also planning a variety of USB printers, scanners and digital cameras, so there'll be no shortage of peripherals.

The iMac represents excellent value for money. It is based on a 233MHz Motorola G3 PowerPC processor, with 512Kb of high-speed backside cache. Apple claims that the G3 is almost twice as fast as a Pentium II running at the same clock speed. In fact, its performance depends very much on the type of software you run on it, but there's no denying it's a fast machine.

The processor is backed up by 32Mb SDRAM, 4Gb hard disk, 24X CD-ROM and 56K modem. The graphics chip on the motherboard is an ATI 3D Rage IIc with 2Mb VRAM, which handles both 2D and 3D graphics. That's just as well, because the iMac doesn't have any expansion slots. If you want to boost 3D graphics performance you can increase the VRAM to 6Mb, but you don't have the option of adding a dedicated 3D graphics card. The G3 processor and ATi chip can handle 3D games such as Quake and MDK with no trouble, but dedicated gamers who want their slots will have to buy one of Apple's other models.
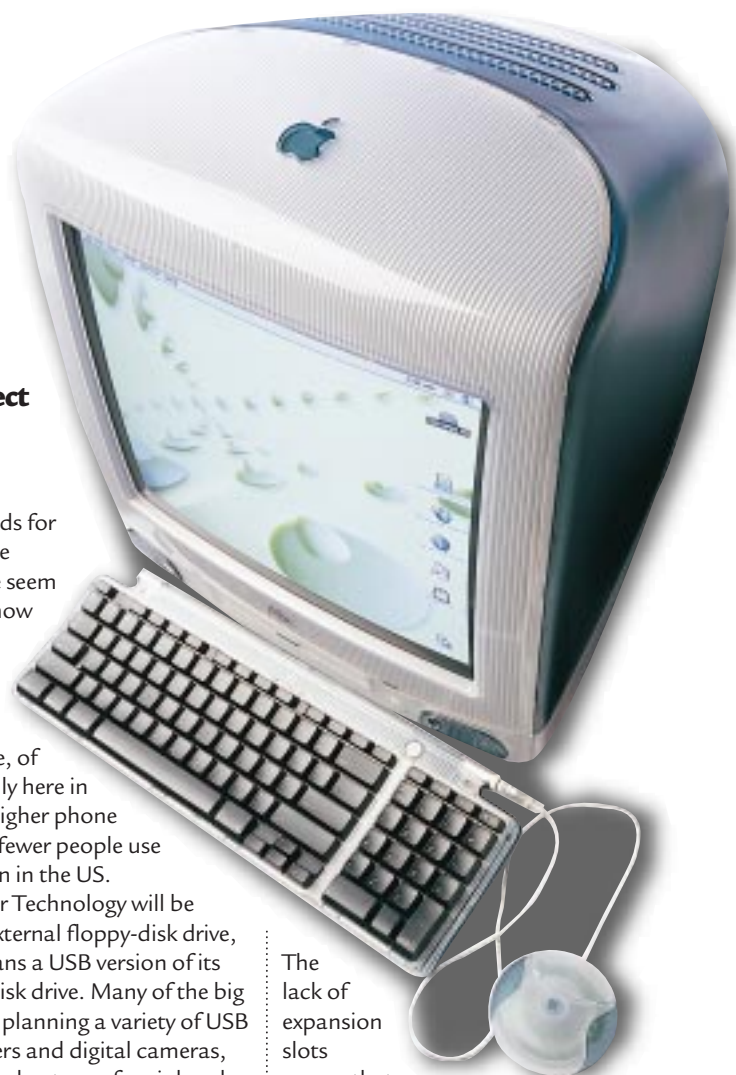
The lack of expansion slots means that the iMac won't be suitable for all users. However, its striking and innovative design is well-suited for the home and education markets at which Apple is aiming. And, although it breaks the £1,000 barrier that is so important in the consumer market, the iMac still manages to pack in some pretty powerful hardware. Above all, the iMac proves that Apple has learnt to be different again, and it should sell bundles this Christmas.

CLIFF JOSEPH

PCW DETAILS

★★★★

Price £999 (£850 ex VAT)
Contact Apple 0870 6006010
www.apple.com
Good Points *Looks gorgeous. Good value for money.*
Bad Points *No floppy drive or PCI slots.*
Conclusion *A superb machine for the home or education, but serious gamers may prefer a machine with more expansion potential.*

Packard Bell
Platinum 2020

With its powerful, high-tech Platinum range, Packard Bell is cornering the PC retail market.

Packard Bell is up with the giants in the PC sales league. This is down to several factors. First, the company has a powerful brand. Second, and more pertinently, Packard Bell sells its PCs almost exclusively through the Dixons Stores group — so you'll see them in Dixons, PC World, Byte and Currys. Since there has been a certain shift towards buying PCs on the high street, Packard Bell has come out well. However, historically the machines themselves have tended to be respectable rather than outstanding, and perhaps slightly overpriced.

The Platinum range of PCs is designed to appeal to the advanced home user. They are well-specified and fast, and will endure the rigours of modern gaming as well as hardcore greedy applications, too. It also makes use of new technologies, with, for instance, the presence of a DVD-ROM drive as standard. The model that winged its way to our Labs had an impressive specification. Powered by a 400MHz version of the now ubiquitous Pentium II processor and backed up by a thunderous 128Mb RAM, the Platinum makes a good start. The hard drive was an 8.4Gb UDMA Maxtor model; this was slightly disconcerting, as the specification stated it would have a 10Gb drive.

Packard Bell has chosen to use branded components only, and this makes for lots of interestingly uncatchy names. Starting at the bottom we see the Packard Bell own-brand "MediaBooster" motherboard based on the Intel 440BX chipset, currently the most advanced chipset for Pentium II processors. The whole system itself is quite stylish, with speakers and subwoofer built in to the monitor, an easy-to-access "Gulliver" midi tower and a "Legacy MediaControl" keyboard containing quick-access keys to the various multimedia functions. You get the point about the branded components, anyway.

The Platinum also makes use of emerging technologies, or to be more precise, those which have hatched but are not yet flying. For example, everybody knows about DVD, but most people don't yet have a DVD-ROM drive. The 17in monitor arrived with a slight magenta bloom towards the top right-hand corner, but this was soon fixed by degaussing the monitor manually several times. That aside, the monitor had a 15.9in viewable diagonal. It was also pretty compact, considering the built-in speakers.
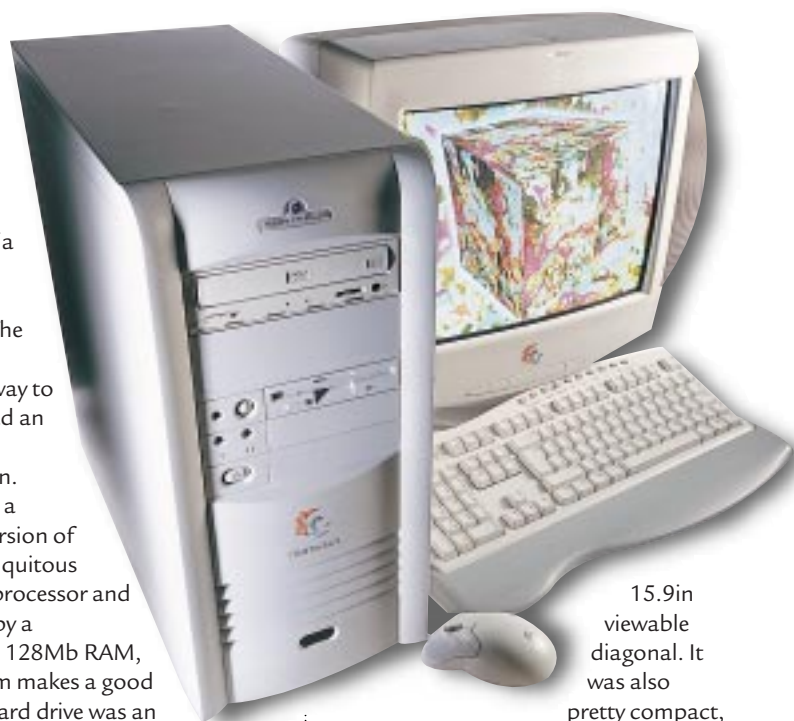
The graphics card included was an 8Mb ATi 3D Rage Pro-based card which fitted into the AGP slot. The Rage Pro features hardware assist for DVD decoding: in other words, it won't completely decode a film but will help with some of the scaling operations. The graphics capabilities were duly put to the *PCW* benchmark sword and emerged with a respectable overall score in the Final Reality graphics benchmark. Also worth mentioning are the 64-voice sound card — fairly unusually, a PCI version — and an internal 56Kbps voice modem. The rest of the system was tested using SYSmark 98, when the results continued to hold their own.

There is plenty of room for upgrading — one ISA, two PCI, one shared PCI/ISA and one DIMM slot within the chassis. There are also three front-loading bays, one 5.25in and two 3.5in.

A plethora of software goodies is provided — from MS Word and Works 4.5 to the DVD version of Blade Runner and a wealth of communications software. And all this for £1,761 including VAT. Packard Bell is clearly getting the message with its pricing.

JIM HARYOTT

PCW DETAILS

★★★★

Price £1,761 (£1,499 ex VAT)
Contact Packard Bell 01628 508200
www.packardbell.co.uk
Good Points *The Platinum 2020 is well-specified and has a marvellous software bundle. It also benefits from good documentation and ease of use, plus the reassurance of high-street buying.*
Bad Points *The price, while good for a high-street PC, can still be undercut elsewhere.*
Conclusion *The Platinum 2020 is a great top-end high-street PC. But you can still do better by buying direct.*

PERFORMANCE RESULTS

0	50	100	150	200	

SYSmark 98 — 162

0	1	2	3	4

Final Reality — 3.91
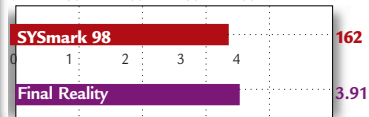
Siemens Nixdorf
Scenic Mobile 800

A high-end notebook with some novel features.

Technical innovation is not always easy to achieve. As a result, many of the notebooks that pass through the *PCW* Labs are all very similar, with slight differences in build quality and components. The Siemens Nixdorf Scenic Mobile 800 stands out from the crowd for one simple but innovative reason — it has a detachable keyboard.

The whole of the front of the notebook lifts off, so the keyboard and trackpad can rest on the desk. The keyboard communicates with the notebook via infra-red, with an IR port on the front of the notebook and the back of the keyboard. You can put the notebook up to 3m away at an angle of up to 120°, and a little way above or below the main unit. If the keyboard temporarily loses contact with the main unit, keystrokes will be stored, then sent once it's in range again. But don't expect to go away and type your novel and then feed it into the notebook — it will only remember a few dozen characters. The battery in the keyboard recharges when it's reattached to the main unit.

The removable keyboard would be useful in presentations, enabling you to set the notebook up for your clients to see and use the keyboard to control the presentation from a comfortable distance. It's also better in terms of ergonomics than the average notebook, as the keyboard is at a more comfortable height to type on, plus you can place the main unit back on your desk and raise it up, so the screen will be further back and at eye level. As the screen is a 14.1in TFT, you can probably dispense with a second screen on your desk and, of course, a second keyboard and mouse, although there are ports on the notebook for all these devices should you need them.

Despite all the advantages of the removable keyboard, it's not wonderful to use. The keys and trackpad are housed in fairly flimsy plastic. If you're a heavy-handed typist, you'll feel the housing needs to be much tougher to withstand the pressure. It could also do with some rubber feet underneath to stop the keyboard from sliding across your desk as you type. The trackpad hasn't been very well thought out either. It's responsive, but the buttons which sit at either side are awkward to use.

The unit's casing is made of magnesium alloy, which is supposed to keep the weight down and conduct heat away from the unit. In our tests, it didn't do either. It still weighs in at a heavy 3.8kg and ran very hot when just doing a little light word processing. We had to sit it in front of a fan to get it to complete our benchmark tests.

One thing that can be said for magnesium alloy is that it looks very stylish, which is more than can be said for the floppy and CD-ROM bays. These were made out of plastic and felt insubstantial. Another poor design point is the lack of a cover over the rear ports, leaving them open to dirt and damage.

But all is not doom and gloom. The 5Gb hard disk is partitioned into three segments and loaded with a number of useful utilities. Meanwhile, the 14.1in XGA screen is driven by an ATi 3D RageLT Pro chipset, backed up with 4Mb of SGRAM. This would allow an external monitor to be driven at up to 1600x1200 at 85Hz in 64K colours. The processor is a mobile PII 266 and there's 64Mb of system RAM.

All things considered, the Scenic Mobile 800 suffers from trying to be too clever. The removable keyboard is a superb idea, but needs to be refined before it can prove its worth. And, of course, the heat problem needs to be addressed.

ADELE DYER

PCW DETAILS

★★★

Price £5268 (£4499 ex VAT)
Contact *Siemens Nixdorf 01252 373035*
www.sni.co.uk
Good Points *The removable keyboard is a nice idea.*
Bad Points *The nice idea doesn't work well.*
Conclusion *Too many gimmicks and too little thought have gone into this notebook.*

PERFORMANCE RESULTS

	0	50	100	150	200	
SYSmark 98						109
	0	1	2	3	4	
Final Reality						3.03
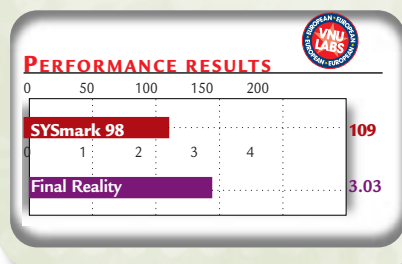
Philips Nino
Chic and cheerful

The range of Windows CE palmtops grows with this stylish offering from Philips.

The Nino is all about style. Sure, this review is going to tell you about the processor, the memory options, the built-in software, and all that jazz. But if you decide to become a Nino owner, I bet that the styling is a significant factor in your choice. Why? Well, for a start, the choice of PDAs is now very wide, and the technical specs are often similar. Secondly, and more importantly, this is simply a very stylish bit of kit.

The Nino fits comfortably into the hand (13.3x8.7x 2.2 cm) and weighs 200g including the two AA batteries. It comes with a set of NiMH rechargables, and a recharger. Philips claims about 12 hours per recharge (I reckon a bit less, but then, I use the backlight reasonably frequently). The unit is roughly the same size as a 3Com Palm, being 1cm longer. The comparison with the Palm is significant, since that must be the main competitive target for all of these up-and-coming machines running Microsoft Windows CE for a Palm-size PC.

The screen is significantly better than a Palm's. Not only is it backlit and touch sensitive, it also has four shades of grey and a resolution of 320x240.

Just like the Palm there is no physical keyboard, so all data is input through the screen with a pen. There are several alternative methods, however. There's a virtual qwerty keyboard from which you can select letters with the pen tip, then there are two flavours of character recognition. One of these, the annoyingly capitalised smARTwriter, requires a degree of training but it repays the effort. All you have to do is show it how you like to form your characters by entering several examples. Then you can print on the screen — no cursive script — and as soon as you pause for breath, the software will turn your characters into text. Accuracy is fair to good, and the system is certainly usable for inputting notes. The second flavour of character recognition requires you to learn a character set and is similar to Graffiti on the Palm.

A whole host of other software is included: the standard CE pocket apps

If you decide to become a Nino owner [I bet] that the styling is a significant factor in your choice

— NoteTaker, Voice Recorder, Channels, Calculator, Solitaire, and Tegic T9 smart keyboard; and ART Pocket Commander and the Nino Expense Manager.

The Nino is based around a 75MHz RISC processor and comes with 4Mb of RAM. An 8Mb version should be available by the time you read this, although prices are not available at the time of writing. Philips assures me that the former is fine if you use the Nino as a data repository for contacts, agenda, and so on. In other words, 4Mb is enough if you don't go loading lots of extra software like I did. The temptation was just too great, because there is so much software becoming available for these machines — games, street maps and the like. The result was a continual string of complaints from the Nino that its brain was full. This condition actually hung the machine several times and it had to be rebooted — a technical term meaning that I removed one of the batteries for a second.
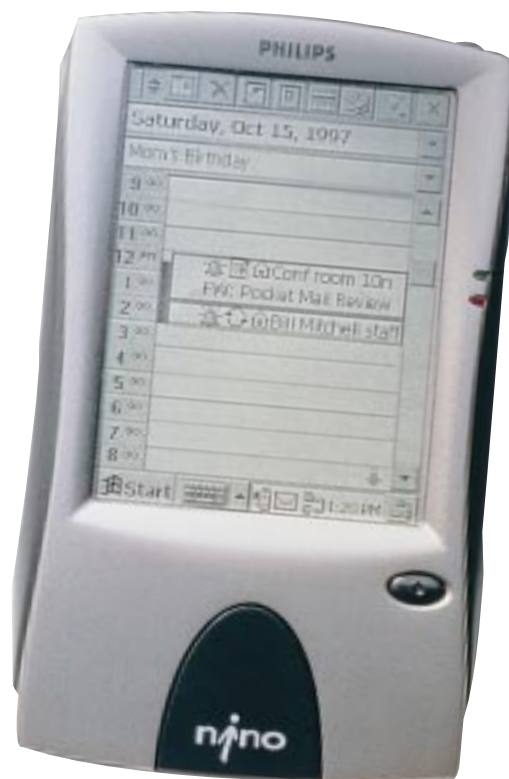
There is a unidirectional microphone that can be used for recording memos and this function can be controlled via buttons built in to the side of the machine. The microphone can also be used, after another training session, for voice activation. I liked the machine a lot, but I never actually got around to talking to it. At least, not in public. There is also an IrDA infra-red transceiver which can be used for, among other exotic functions, beaming your business card to other happy Nino owners.

PC synchronisation software and a rather cute docking station are provided with the Nino, and by the time you read this, the optional 19.2Kbps modem should be out with European approval.

MARK WHITEHORN

PCW DETAILS

★★★★

Price £299.99 for the 4 Mb version (price for the 8Mb version not available)
Contact *Philips 0800 961445*
www.philips.com
Good Points *Style and screen.*
Bad Points *4Mb just isn't enough for play time.*
Conclusion *A fine machine to be used as a mobile data store.*

Psion 3mx
A classic case

Psion's most popular palmtop gets a revamp.

When innovative UK-based computer manufacturer Psion hurriedly called a press conference recently, the hushed tones of the attendees carried predictions of an announcement of a new machine. But while the expectation was of a Series 5c or even a Series 6, what we got was rather less exciting. A blast from the past, the hugely popular Psion Series 3, has been given a new lease of life in the form of the 2Mb Series 3mx.

It doesn't look appreciably different. Sure, the case has a sleeker look and smoother feel than its rubberised predecessor, the 3c, but that that's just a cosmetic makeover. The clamshell case is exactly the same design as before, but that's not a criticism because it's a fine one. Flip it open and still, no difference. The keyboard has the same, small, vaguely pearlescent buttons topped off with a line of membrane-style shortcut icons for the various applications. These, too, remain unchanged. You get a competent word processor and spreadsheet, flexible agenda-cum-calendar, reasonably versatile contacts database, limited jotter facility, user-friendly calculator and a novel though not entirely useful digital audio-recording program. You even get a patience card game to while away those in-between moments of productivity.

Viewed individually, none of these applications represents excellence. But

as a collection of professional applications, there are very few electronic organisers that can compete. So what's actually new? Well, the clue is in the machine's name. Psion has fitted a new processor, made by NEC and called the "mx". On paper, this is three times faster than the 3c's processor, yet it consumes equivalent amounts of power and costs little more to produce.

If it sounds like a good thing, that's because it is. The 3mx's applications now zoom along — and they could hardly have been described running slowly on

> ### The 3mx's applications now zoom along — and they could hardly have been described as running slowly on earlier incarnations

the machine's earlier incarnations. Where once you would have had to wait maybe a second or two for the Series 3 to respond to certain actions, now things happen more or less immediately. It is easily the fastest of its kind on sale.

Of course, there's more than just speed to consider when buying a PDA (personal digital assistant). Perhaps the most important aspects are the screen and keyboard, simply because you will be using them most of the time. We've already mentioned the keyboard, which is for the nimble-fingered, certainly, but quite usable. The screen is almost beyond criticism, however. The ocean-green background offers a near-perfect contrast to the crisp, black pixels displayed upon it. It's also big enough that you can easily edit spreadsheets and documents, and view a week's worth of
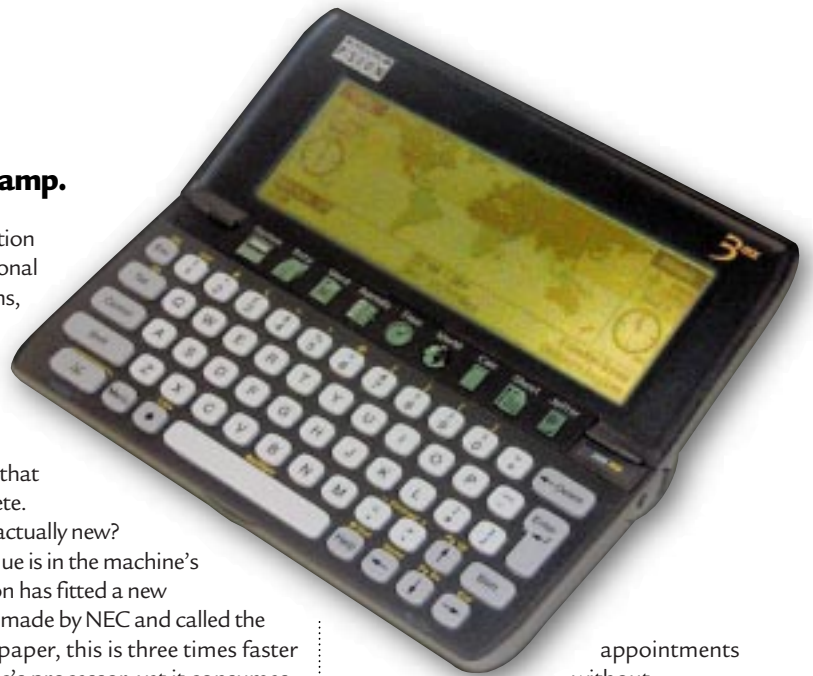
appointments without squinting. The machine even has a zoom feature, so you can choose how much information to squeeze onto the display. And then there's battery life. The latest organisers might boast colour screens, pen-based operation and highly graphical environments, but these features come at the cost of power. Few such devices can manage double-figured hours, and most will conk out after about 4-5 hours of average use. The 3mx's manual claims up to 80 hours — certainly you can comfortably bank on 25, and often you'll get even more. In terms of average daily use, you're looking at a couple of months or so before you have to get friendly with the battery compartment.

A final word about software. The Series 3mx has an impressive suite of applications, but it is also wholly compatible with other Series 3 machines. If you've already got software, this means you won't have to throw it away if you upgrade, and, if you're just starting out, there's a huge library of existing titles to choose from. What's more, for a limited period Psion is bundling the 3mx with a software voucher. Pop this in a post box and in return you'll a receive copy of AutoRoute.

SCOTT COLVEY

PCW DETAILS

★★★★

Price £269.95 (£230 ex VAT)
Contact Psion 0990 143050
 www.psion.com
Good Points A classic design, superb battery life, loads of software.
Bad Points Not exactly state of the art.
Conclusion The Series 3mx is a great electronic organiser but not a huge step forward. Psion is aiming it at first-time buyers and, if you're one such, you won't be disappointed.

Eizo FlexScan L66

A big flatplanel monitor with a big price.

The high costs and low manufacturing yields involved in making large TFT screens has meant that up to now, most flatpanel monitors have stuck at the 15in mark. However, Eizo now has this 18.1in model. It is not the largest flatpanel monitor available — NEC has a 20in display — but it represents a significant step forward.

The extra size makes it ideal for financial institutions with more money than space, who will use this screen to display large spreadsheets, but it also means that the resolution can be pushed up from the standard 1024x768 on 15in models, to 1280x1024. Dual analogue inputs connect two computers at once, and there is a switch on the front to swap between inputs. You can also prioritise one input, so the screen will automatically display that input as soon as it is activated. The OSD is comprehensive and easy to use, with an information option to check your current settings. There are three customisable colour settings.

Overall, the quality of the display was good, although the top of the screen was noticeably darker than the bottom, a problem none of the controls could address. The on/off button is sensibly positioned at the front of the base, which itself is small and houses a USB hub. The FlexScan L66 is also available as a free-mount model, so it can be hung on a wall.

ADELE DYER

PCW DETAILS

★★★

Price Price £2783.58 (£2,369 ex VAT)
Contact PDS 01483 719500
www.eizo.com
Good Points Screen size equivalent to a 19in CRT but much smaller footprint.
Bad Points Cost.
Conclusion One for those with significantly more money than desk space.

Sony CPD-L150

Sony style applied to an LCD.

Like all the Sony's equipment, the company's monitors have always cost a little bit more but have generally been stunners. Now Sony has dipped its toe into the LCD waters with its first flatpanel monitor, the CPD-L150. This 15in TFT screen runs at 1024x768 at up to 85Hz. Remember, though, that refresh rate is not as important with LCD panels as it is with conventional monitors.

The first thing that struck us about this monitor was its vibrancy and very even luminosity. Adjusting the clock-phase settings is a doddle. However, as is so often the case, the auto-adjust button seemed to make the screen worse than it was before, in this case creating clearly visible banding. The controls are all managed through an OSD and a series of six buttons running, unusually, up the side of the screen. There are four colour-temperature settings. The monitor sits on a very small base, giving it a tiny footprint. Alternatively, it can be wall-mounted. The VGA cable and power cables are well hidden behind the unit. There is just the one input, so you can't attach the monitor to more than one feed as with the Eizo unit (*above*). However, it does have a very wide viewing angle of 140° and can be tilted forwards or backwards through an angle of 30°. Overall this is a sound flatpanel monitor, and is a creditable first effort on Sony's part.

ADELE DYER

PCW DETAILS

★★★

Price £1404.13 (£1195 ex VAT)
Contact Sony 0990 424424
www.sony-cp.com
Good Points Bright and vibrant.
Bad Points A little overpriced.
Conclusion A good monitor, but better deals can be found elsewhere.

Panasonic DVD-L10
Portable home cinema

The world's first portable DVD player.

If you're a self-confessed gadget freak with a grand burning a hole in your pocket, then why not swap it for the world's first portable DVD player? At 160x160x43mm and weighing 910g without battery, Panasonic's DVD-L10 resembles an early portable CD player with its silver finish and retro angular sides. Open the lid, however, and you'll find a 16:9 widescreen active matrix TFT colour display measuring 147mm across its diagonal. A button under the screen cycles through the display aspect ratios of 4:3, zoom, or anamorphic-stretch.

The PalmTheatre, as it's more charmingly known, is just that, a portable home cinema on which you can watch DVD feature films or listen to old-fashioned audio CDs: it will even play those dodgy-old Video CDs if you have any lying around, but not CD-R discs. The rechargeable clip-on battery is good for around 2.5 hours — enough for all but the longest director's cuts. Rather messily, the battery supplies its juice through a short external cable which plugs into the same socket used by the supplied AC adapter.

The unit is essentially a portable version of Panasonic's full-size DVD-A150 (£399). It shares the same 10-bit video DAC, although with a slightly lower video-signal-to-noise ratio, and the same spec audio DAC which can handle 96kHz 24-bit audio DVDs. Round the back is an S-Video output, along with a pair of mini-jacks for audio and composite video. The audio jack, cunningly, supplies converted analogue stereo or, with the supplied optical adapter, raw digital PCM, Dolby Digital AC3 or MPEG audio for an external decoder. With the supplied remote control, this makes the unit suitable as a home player connected to your TV and surround sound system. More clever still, both audio and composite video jacks can be used as analogue inputs, turning the PalmTheatre into a colour stereo monitor.
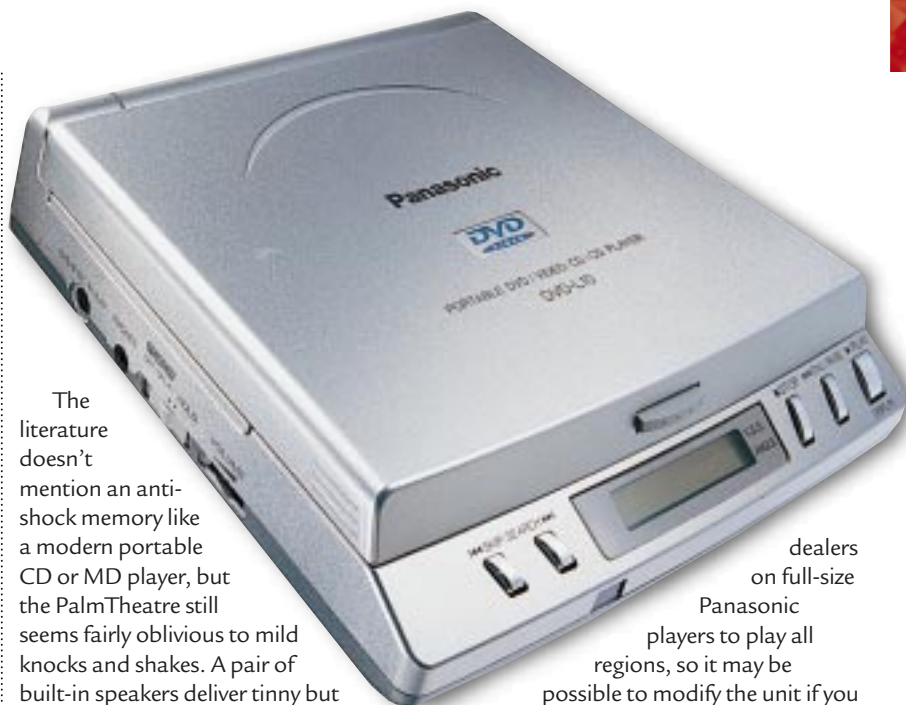
The literature doesn't mention an anti-shock memory like a modern portable CD or MD player, but the PalmTheatre still seems fairly oblivious to mild knocks and shakes. A pair of built-in speakers deliver tinny but acceptable sound for their size. The image is bright but unsurprisingly most resembles watching video on a notebook computer. Come to think of it, you could spend a bit more and buy a notebook with a DVD-ROM drive and do essentially the same thing, and you may be able to tweak software to play titles from multiple DVD regions. We have found that most DVD players for PCs, whether decoding in hardware or software, ask you during installation which region you are in. At this point you could select Region 1, allowing you to play back the wide range of North American titles available. Unfortunately, you can only have one region installed at a time, and most packages only allow you to change it a few times. One trick is to set up two Windows hardware profiles with, say, Region 1 drivers installed on one, and Region 2 installed on the other, offering the best of both worlds.

The UK PalmTheatre is fixed in hardware as a Region 2 device, so will only officially play UK PAL or Japanese NTSC titles. Unofficial hardware tweaks are being offered by some specialist dealers on full-size Panasonic players to play all regions, so it may be possible to modify the unit if you want to play US or other foreign titles; we couldn't find anyone who could do this at the time of writing, though. Anyone unwilling to dabble should evaluate the currently limited range of Region 2 UK titles in the shops and decide whether they're prepared to keep their fingers crossed for more in the future.

Interestingly, most of the shops we visited in London were prepared to sell either the Region 2 UK PalmTheatre or the Region 1 US version. Either way, it's still a versatile, sexy gadget, but I'm not sure who's going to buy it other than a mobile-movie addict.

GORDON LAING

PCW DETAILS

★★★

Price £999 (inc VAT)
Contact Panasonic 0990 357357
www.panasonic.co.uk
Good Points DVD movies for the home, office, caravan or train.
Bad Points Relatively short battery life and messy battery cable.
Conclusion Sexy, but a notebook with DVD may be a more flexible choice.

Lego Mindstorms
Not just kids' stuff

A hot new gadget that is literally a mindstorm.

Some people say Wagon Wheels are smaller now than they were when you were a kid and, in truth, it seems that most things have got smaller as you have got bigger. Something that has reversed the trend, though, is the work of those clever people at Lego, which just seems to have got bigger, better and more diverse as the years go on. Now, with Lego Mindstorms, they seem to have surpassed even themselves, by venturing into the formerly uncharted territory of programmable plastic bricks.

With a staggering 700 building components in the box — we're reluctant to call them bricks as they include tubes, wings, bands, wheels and all manner of strange and unusual attachments — this is a mammoth set. Delve a little deeper and you'll find yourself coming across light sensors clever enough to know the difference between red and blue, and pressure gauges with built-in switches to make your creations turn or move on their own. Perhaps the most important and impressive bricks, though, are two large blocks bigger than the rest: these are the driving force behind Mindstorms.

The first, shaped somewhat like the nose cone of a NASA Shuttle, attaches to your PC's COM port. The second, a more conventional rectangular shape, is the basic block around which you will build your models. Each sports an IR device — transmitting on the nose cone and receiving on the block — that allows you to program the actions of your creations using the simplistic drag-and-drop PC software. Once you have "constructed" your commands on-screen in much the same way that you build your model by putting subroutine bricks on top of one another, it can be transmitted to the model and, because it is written to the remote memory, the PC can be turned
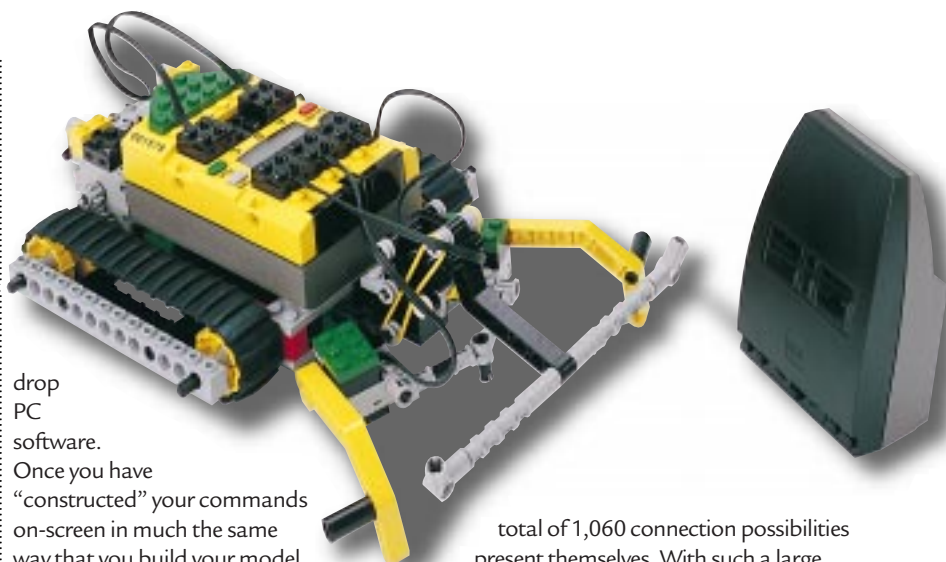
If you don't have children of your own, borrow a few, then take them with you when you buy. You'll feel less embarrassed…

off. Stored in the receiving brick, it can now be activated using the four buttons on top of your model. If this all sounds a bit intimidating, an extensive set of animated tutorials will take you through everything from installing the batteries to completing your first model, a scaled-down version of the Mars Pathfinder buggy. Leading you through one brick at a time and showing exactly how each should be attached, it then moves on to the rather more important matter of how you tell the model exactly what you want it to do.

Of course, every brick in the Lego range is a standard size, which means that when you've exhausted the possibilities offered by the basic kit you can add to it to create an infinite number of possibilities. Two eight-stud bricks can be joined in no less than 24 different ways. Add another, and a total of 1,060 connection possibilities present themselves. With such a large set, we sometimes found it difficult to find what we were looking for. Although the pieces were sorted into a semi-logical collection of bags, it still took us a good ten minutes to find the sensor bricks, even though we knew exactly what we were looking for. We also found the software's insistence that we complete the training sessions before being let loose on the programming language a little irritating: we would have liked to be able to get straight into the product and use it.

According to Lego's web site, which also explains that in Latin the word Lego means "I put together", Lego bricks are played with by more than 300,000,000 children in 130 countries. With the arrival of Mindstorms, we feel it's time to redress the balance. Over ten years of development in partnership with MIT have made this set too much fun to be confined to the kids' bedroom. If you don't have children of your own, pop out and borrow a few, then take them with you when you buy the set: you'll feel less embarrassed. But whatever you do, don't let them get hold of it — you'll never get it back.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price £160 (£136 ex VAT)
Contact Lego 0845 606 2043
www.legomindstorms.com
Good Points Innovative, extensive, endless fun.
Bad Points Difficult to find pieces. Bossy software.
Conclusion Guaranteed to bring out the kid in everyone.

Yamaha WaveForce 192XG

Sounds good: an audio card that's a boon to music and games.

The WaveForce 192XG is the first in a line-up of low-cost PCI sound cards from Yamaha. Using a combination of hardware and software, it can produce up to 192 instrument voices from three independent synthesisers. The core processor integrates a monophonic S-VA (Software Virtual Acoustic) tone generator and a 64-voice, 2Mb WaveTable ROM based on the popular DB50XG daughterboard. The S-YXG50 software synth provides an additional 128 voices, equal in quality to the DB50XG. This is the first audio card to offer S-VA synthesis, a technology that was once exclusive to professional MIDI instruments. It generates sound by running virtual simulations of acoustic instruments to reproduce music with greater realism than WaveTable alone. There are 256 instruments to play with, which can be accessed using any MIDI sequencing package. Note that this is a highly processor-intensive application and requires a 233MHz Pentium II to run.

Games support comes in the form of Direct Sound, Direct Sound3D, A3D and SoundBlaster compatibility. Inside, the card has connectors for CD audio, auxiliary and video devices, such as DVD. A Tad port enables compatible modems to be connected to provide two-way telephonic communications. There are connectors for speaker and line output, mic and line input. Audio from the mic input can be routed to the three internal effects buses, including reverb and chorus settings. Bundled software includes a 100-track MIDI sequencer, an audio-file player with 100 classical-music MIDI files.

STEVEN HELSTRIP

PCW DETAILS

★★★★

Price *£69.99 (£59.56 ex VAT)*
Contact *Yamaha Kemble 01908 366700*
www.yamaha.co.uk
Good Points *Easy installation. S-VA synth. Downloadable sound support. Price.*
Bad Points *Slight hiss when instruments are played back.*
Conclusion *Wide range of high-quality features for musicians and gamers alike.*

Iomega Buz

The Buz is a real steal compared to its costlier video-capture competitors.

After almost cornering the market for portable storage devices, the Buz is Iomega's latest venture. It's aimed at multimedia producers and home video enthusiasts. The package comprises a PCI card and a snazzy purple break-out box for connecting the VCR or camera, plus MGI Videowave SE for editing. The card has video capture hardware as well as Ultra Wide SCSI and can be used to connect other SCSI devices.

The rugged break-out box is a particularly useful component. It eliminates the need to fiddle with cables behind the computer or under the table. It sits on top of the system, and connecting a VCR or camera to it is a straightforward process. VCRs come with S-Video or composite video outputs. The box is capable of accepting both types. We first tested the Buz on a new 333MHz Pentium II with 64Mb RAM and a fast hard drive. True to Iomega's claim, the card captured full-screen MJPEG video with no frame loss or distortion. However, the capture rate became irregular on an older Pentium 133 with 32Mb RAM. You'll also need Windows 98 or Window 95 OSR2 and two free system IRQs. For these reasons, some older systems won't be compatible with the Buz. The unit doesn't capture audio: for that, you'll need to use your existing sound card.

Videowave SE isn't competing with the likes of Adobe Premiere, but it's fine for basic edits, captions and fades. And compared to its costlier counterparts like the Pinnacle DC 30 and the Fast AV Master, the Buz provides almost equivalent versatility at a much lower price.

AJITH RAM

PCW DETAILS

★★★★

Price *£189 (£161 ex VAT)*
Contact *Iomega 0800 973194*
www.iomega.com
Good Points *Full frame, full motion analogue video capture. Dual-use SCSI card. Useful software bundle and tutorial.*
Bad Points *Needs a reasonably powerful PC. No digital video capture.*
Conclusion *The ideal solution for digital video editing enthusiasts on a budget.*

Gravis Xterminator

It's a gamepad with knobs on.

Gamepads have traditionally been associated with consoles, with PC games generally being controlled via joystick. But the excellent Xterminator digital gamepad from Gravis looks set to change all that. Our first impression was that the ergonomics were excellent. Solid without being overly heavy, the positioning of the numerous buttons and directional pads (D-Pads) feel natural, a sure sign of good design. The Xterminator offers both digital and analog controls, with two D-pads positioned on the left-hand side of the gamepad. Top left is the analogue controller: similar to the analogue control on the Nintendo 64's pad, it offers pretty much the same response as a conventional joystick. Controlling it with a thumb rather than a hand takes some time to get used to, but we found it precise and well weighted. The other D-Pad is digital and offers eight-way control.
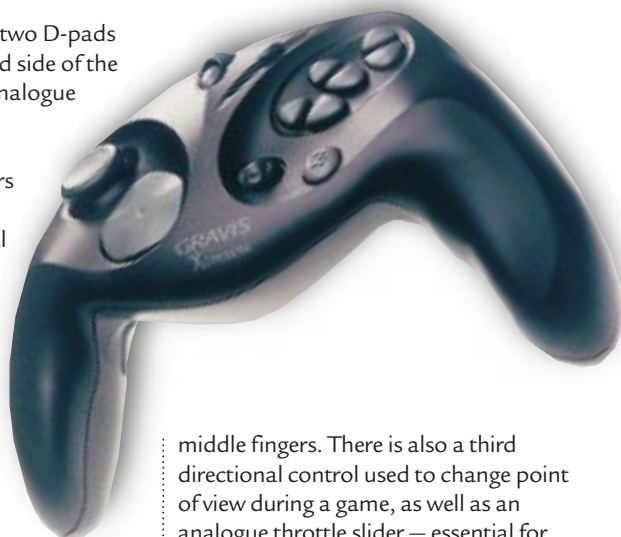
The best thing about the Xterminator is how much else the designers have managed to cram on while still making it a delight to use. There are analogue flippers on the underside, and digital triggers lower down operated by your middle fingers. There is also a third directional control used to change point of view during a game, as well as an analogue throttle slider — essential for flight sims. Finally, there's a switch that, when pressed, allows a second set of pre-programmed controls to take over, effectively doubling the amount of commands you can give through the pad.

PAUL TRUEMAN

PCW DETAILS

★★★★★

Price £39.95
Contact *Gravis 0800 252359*
www.gravis.com
Good Points *Sensitive analogue controller. Squillions of buttons.*
Bad Points *No plans to bundle games with it. Gamepads don't suit everyone*
Conclusion *If you like gamepads, you'll love this.*

8x8 ViaTV Phone

Two-way videoconferencing *sans* PC.

Recent months have seen the release of the Quickcam VC from Connectix and Creative Labs' WebCam II — cheap, user-friendly cameras that sit atop the monitor and send the images down the phone lines. The idea behind the ViaTV from 8x8 takes a slightly different tack: to take the PC out of using the videophone. The principle is the same as that of internet videoconferencing devices. But the ViaTV Phone sits on top of the television, and sends the pictures directly down the phone line through its own internal modem to the other videophone. As well as being able to hook up to other TV Phones, 8x8's camera can also make video calls to any other videophones that use the H.324 standard for modem-to-modem connections over the phone lines. The camera connects to the TV via the SCART socket, and to the existing phone line via a two-way socket into which you plug the line from your telephone. It took us about five minutes to set up, ready for our first attempt at PC-less videoconferencing. Once you have phoned the recipient of your call, you can then initiate the video-connection. Using the buttons on the phone, you can bring up menus that can alter picture quality as well as frame rate. The picture at its "fine" setting was impressively sharp but its frame rate dropped dramatically, and any sense of continuous movement was lost. At the "fast" rather than 'fine' setting, the frame rate was very impressive although the picture was pretty awful.

PAUL TRUEMAN

PCW DETAILS

★★

Price *£399 (£339 ex VAT)*
Contact *ViaTV 0800 9808889*
www.8x8.com/europe
Good Points *Ease of use.*
Bad Points *Can't combine good motion-video quality with a sharp picture.*
Conclusion *Nice idea, poor performance.*

Tax 98 *vs* Quick Tax 98
Salvation for DIY tax returns

Efficient and reliable software to help you sort out your self-assessment.

With the Inland Revenue apparently determined to continue its drive to make us all tax inspectors, several software publishers have responded to our anguish by producing software that aims to simplify these arcane matters. Two such are **QuickTax 98 and Tax 98**. Both are by major business software publishers, the first by Intuit, of Quicken and QuickBooks fame, and the second by SB Software Publishing, a division of MAP Pastel, the business accounting software specialists. Both programs aim to lead you through the often-baffling sections of your Tax Return via guided interviews in the form of on-screen questionnaires. Answer them accurately and the programs fill in your Return for you. Not only that, but they print it out too, ready for you to send off.

QuickTax 98 installs without problems, and is ready to run immediately. It comes with a slim manual with enough guidance to get you started. There was no manual with Tax 98, but we were looking at a preview version. QuickTax 98's install does have a couple of idiosyncrasies. It insists on installing onto your C: drive — if you prefer to keep your personal data elsewhere, perhaps for ease in backing up, well, tough. It also needs a password to run, involving telephoning the publisher with an "activation key" apparently generated from your address and telephone number. Though even with a password installed, you can't print anything until you have registered the software first — or at least filled in the registration form — almost as if it were shareware. Not a program to install over the weekend.

Both programs let you enter data directly into on-screen forms, with QuickTax having the more frighteningly realistic representations. In both programs, you do need to know, of course, exactly how to fill in the boxes.
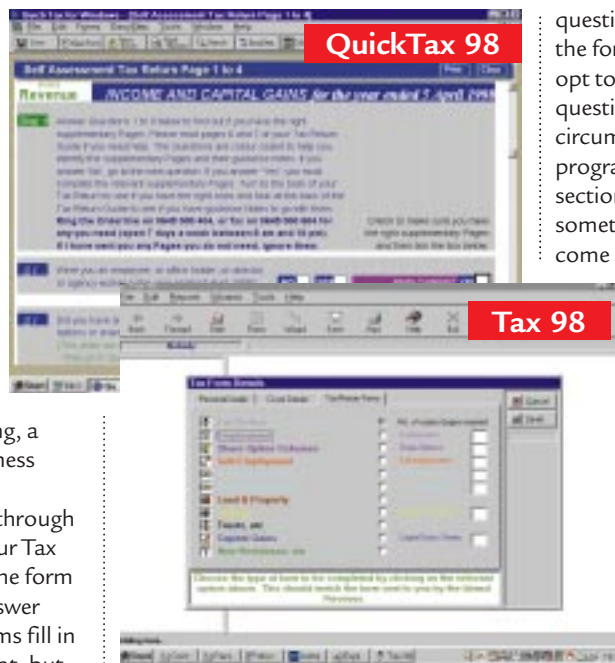
It's also up to you to choose the right forms in the first place. In both programs, you can access the standard Windows Help search box. Tax 98 has the edge here, its help screens being generously illustrated and leavened with wit. In addition, both programs offer context-sensitive help. Again Tax 98 is more elegantly implemented. Moving the mouse pointer over a form's numbered boxes changes the icon to a question mark which, when clicked, displays the Inland Revenue's notes for that question. Similarly, moving the mouse pointer over certain words and icons offers you a relevant tax tip, a little more hit-and-miss. QuickTax has instructions and notes reproduced from the Inland Revenue's own forms and offers advice on saving tax, which you can call up separately. Tax 98 has its Tax Glossary and Tips, although these tend to brevity, but scores with other tools like tax code and liability calculators.

On the other hand, QuickTax 98 can hold your hand all the way through, with its EasyStep on-screen interview in which it automatically fills in the forms' boxes according to your answers to its questions. Even if you've decided to fill in the forms without its assistance, you can opt to switch it in at any time. The questions vary according to your circumstances: if you're employed, the program skips the self-employment section automatically. If there's something you don't know, you can come back to it later (if you forget, QuickTax will remind you). At the end of the procedure, you can ask the program to check for errors for you. If it finds any, it takes you back to them, right down to the individual box, for correction.

Both programs will print your Tax Return for you to send off to your tax office, including your attached notes and calculations. Both programs also let you prepare Returns for any number of people.

JAMES TAYLOR

PCW DETAILS

Tax 98
★★★

Price £19.99 (£17 ex VAT)
Contact SB Software Publishing 0161 630 7000
www.sbpublishing.co.uk
Good Points Lots of help. Useful tax liability calculators. Low price.
Bad Points Awkward installation. Not so intuitive in use.
Conclusion Does the job efficiently and is remarkable value. Pity about the password palaver.

QuickTax98
★★★★

Price £29.95 (£25 ex VAT)
Contact Intuit 0800 585058
www.quicktax.co.uk
Good Points EasyStep interview questionnaire. Realistic forms. Inland Revenue guides.
Bad Points Not so easily integrated with Quicken as the advertising suggests.
Conclusion Almost makes self-assessment a pleasure.

WinForecast 32

The latest version of PASE's **financial forecasting software** offers 32-bit speed and better integration. Although aimed at accountants, especially in practices or multi-department corporate organisations, this isn't accounting software in the usual sense of that term. It won't record your daily transactions nor do the books. What is does do is calculate the financial effects of changes to your predicted income or expenditure. You can then decide whether these changes will benefit your profit and loss, balance sheet and cashflow.

The obvious alternative to WinForecast 32 is the spreadsheet, which can also offer automatic totalling, carrying forward, analysis, calculation by formulae and percentage, and the ability to work backwards from a target position. It takes a lot of trouble to get up and running though, and won't give you the same level of sophistication as WinForecast 32. Getting your data into

WinForecast is by database-like entry screens, or you can import data from a spreadsheet. You can also hotlink to a database or spreadsheet. Entry fields can include complications like PAYE, National Insurance and pensions, income tax, and overdrafts. You can also enter any opening balances, and allow for overheads, credit period and discounts, to produce an accurate facsimile of your trading patterns.

Getting your manipulated data out of WinForecast is done through the Report Generator. Installed separately, this is a Word 95 or 97 template which allows data, graphs and Reports from WinForecast 32 forecasts to be incorporated in Word documents. The way in which the data is presented to Word can be customised from WinForecast. Tough, of course, if you haven't got Word.

JAMES TAYLOR

PCW DETAILS

★★★★

Price *£249 plus VAT single licence, to £949 server licence with multi-year & consolidation*
Contact *P.A.S.E 01289 307000*
www.atlantic-coast.com
System Requirements *Windows 95 or NT, 8Mb RAM, 8Mb hard-disk space.*
Good Points *Flexible and fast.*
Bad Points *The price may make small businesses think twice*
Conclusion *Useful for small businessses; indispensible for accountancy practices.*

Adobe PhotoDeluxe Business

Adobe is better known for its professional graphics packages like Photoshop, but it hasn't cut corners on PhotoDeluxe. It has simply taken the most useful features and made them even easier to use with a spin toward the small business. PhotoDeluxe has a simple task-orientated user interface. All of the regular features can be accessed from the six tabs on the left-hand side.

The tasks are divided up into logical sections. In Get and Fix Photo, you can import your own photos from virtually any source and then use the touch-up tools to fix your image. You can remove dust and red-eye as well as unwanted elements — such as a troublesome ex-boyfriend. A huge number of special

effects are included, ranging from adding silhouettes, motion effects and tinting. The special projects section is especially useful and includes business cards, labels, report covers, stationery and flyers. You can even design presentations.

The Send and Save function guides you through how to export your work, whether it's to your hard disk, a printer, or the web. Although helpful at first, it

can get irritating to have to walk through all the steps, so the more common methods of export are included in the pull-down menu at the top. Considering the price, PhotoDeluxe Business Edition has an amazing amount of functionality and you'll never get stuck wondering what to do next. You'll probably want to use it on a fairly fast PC, though, or you may find it is a little sluggish.

SUSAN PEDERSON

PCW DETAILS

★★★★

Price *£93 (£79 ex VAT)*
Contact *Adobe 0181 606 4001*
www.adobe.com
System Requirements *Pentium processor, Windows 95 or NT4.0, 16Mb RAM, 70Mb disk space.*
Good Points *Perfect for someone who wants to spend more time running their business than fiddling with software.*
Bad Points *Once you know how to do something, the step by step process grates.*
Conclusion *A great graphics package for the small business with a decent-spec PC.*

LapLink Tech v1.5

LapLink has been growing at meteoric speed. It is now capable of connecting and supporting a whole host of connection methods.

LapLink has gone from strength to strength to become a standard-setter in the realms of mobile computing and remote access. It now supports myriad connection methods backed by a host of useful tools. LapLink Tech v1.5 targets technical support staff directly and brings in some extra tools specifically aimed at easing their life. Standard serial or parallel links for local connections are available and both types of cable are included. Or, you can dial-up a remote PC directly, using modems, or link across a network. Both IPX and TCP/IP protocols are supported so, for the latter, you can access another PC over the internet for the price of a local call. Using this method can leave both systems wide open, and it's reassuring to see that LapLink comes with some tough security measures.

There are four main differences between this version and the standard LapLink. LapLink Tech now includes print redirection so a user running a remote control session can load a document on the remote PC and print it locally on their own printer rather than copying it across first. Alternatively, documents on the local PC can be printed directly onto a remote printer attached to another system running LapLink. A Chat facility allows keyboard-related conversations between LapLink users and this has now been beefed-up with support for full-duplex voice communications. Not all sound cards support this, so

▼ **Duplicate entire hard disks or partitions with Ghost SE, but bring a good book if you're using a parallel connection**

you may have to use half-duplex. In this mode, you must wait for the other user to stop talking before you speak. To help, the Voice Chat window has a small indicator in the corner that turns green when it's your turn to talk. The other two utilities are not actually a part of LapLink and are installed separately.

Ghost SE is a DOS utility for cloning complete hard disks or partitions. Support staff will find this useful as they can create a hard-disk image and restore it to a new PC. A complete byte-for-byte image, including the boot sector, can be taken so that a standard set of applications can be applied to multiple systems. Unfortunately, Ghost SE is haunted by a few minor problems. I cloned a Windows 98 system with a 750Mb hard disk onto another bare system using a parallel-port connection and it took over one and a half hours — try this with 6Gb of data and you'll be waiting the best part of a day. Ghost SE supports removable media so I cloned the same system to a Jaz disk which took 16 minutes, while restoring the image to the recipient PC took only 12 minutes. A further problem will be hardware conflicts if the recipient is not identical to the donor machine; on my system, Windows 98 spent another half-hour running a new hardware discovery routine. After that it worked fine, but

▲ **Support staff can control another PC without leaving their desk, while SmartXchange keeps file and folder synchronisation simple**

Windows NT will not be so amenable. Virus protection is Dr Solomon's WinGuard, which loads as a background task and provides real-time virus scanning. Open a file, load a floppy disk and read it, download something from the internet or copy a file from another PC, and WinGuard will check it first before allowing it on to your PC.

LapLink Tech offers no major improvements over the standard product. However, the extra utilities will undoubtedly prove useful and turn what is already an extremely good remote access product into a great one.

DAVE MITCHELL

PCW DETAILS

★★★★

Price Single user £199.69 (£169.95 ex VAT); ten users £89.89 (£76.50 ex VAT) per user; 500-1,000 users £69.91 (£59.50 ex VAT) per user.

Contact Traveling Software 0800 374849
www.travsoft.com

Good Points Supports a wide range of connection methods, backed by good security.

Bad Points Disk cloning over parallel connection is excruciatingly slow.

Conclusion No radical improvements but still one of the best remote access products around.

Macromedia Fireworks

Fireworks really sparkles and makes creating complex web graphics a simple affair.

Web sites are no longer just graphics and text. Although there is no substitute for quality content, it certainly helps if it is presented well. You are not, after all, going to have many repeat visitors if the presentation of what you have written is ugly or inaccessible. Macromedia has made creating complex web graphics simple. It was formerly necessary to use a number of packages to generate many effects, but with Fireworks this is no longer true. Far more than the simple image editor it appears to be, this package is a powerful tool for generating economical elements while retaining high image quality.

First time users would be wise to start working through the tutorials in the manual, which start by introducing the user to the 32 basic tools and the toolbars used to generate and customise images. Each lesson is presented as a case study, outlining a problem and its solution. Launching with a look at image maps, it shows that users no longer need to create the base image in one package before either loading it into an image mapper or embarking on the rather fiddly process of working out the co-ordinates themselves.

Fireworks cuts out the need to switch packages, by using the same selection tools utilised in the original drawing process to define the map hotspots. Similarly, its innovative use of a layered effect allows for the easy creation of animated gifs. It was previously necessary to paint several images, each of which would be loaded into a generator for sequencing. Fireworks is intelligent enough to realise that a multi-layer image could potentially be an animated gif and presents this as a file-type option in the Save dialog. Before committing yourself to exporting your work, an option for previewing the animation allows for image-quality
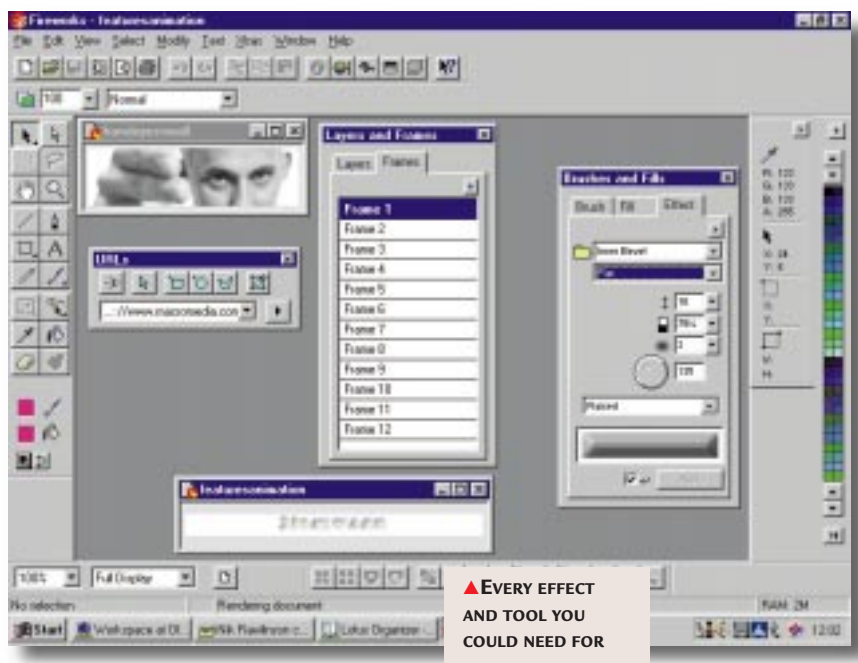
▲**EVERY EFFECT AND TOOL YOU COULD NEED FOR SIMPLE WEB GRAPHICS PRODUCTION**

tweaking and the fine-tuning of timings between frame changes.

One of its most impressive functions is its simple creation of rollover buttons; in effect, an image that hides another behind it — rolling the mouse over one reveals the graphic beneath. This is most often used to "highlight" a button but can be put to good use by placing context-sensitive help beneath an image that links to another part of your site. It's a simple concept, but it takes a certain amount of complex programming to put to use. By setting up the initial image and the rollover on separate layers, Fireworks will allow you to export the graphics with the associated HTML section which can then be copied and pasted into your own pages. Drop shadows with faded edges, as well as highlights or emboss effects employing a portable light source, can be applied with a single mouse click. Further, Fireworks understands that users may start with an original image from a digital camera or scanned photo onto which they wish to overlay drawn elements. While the images retain their bitmapped format, the vector objects are formed using paths and brushstrokes, which effectively means they can be edited and

A powerful tool for generating economical elements while retaining high image quality

filled without damaging the underlying structure of the photograph. With a 30-day trial version available on the net, Fireworks is not a fully-fledged web-page creation package, but then, it doesn't set out to be. It will not generate award-winning pages from scratch, sorting out tables, frames and style sheets; that is left to the likes of FrontPage 98 or HotDog. Fireworks will, however, generate the JavaScript coding necessary to create impressive content. Its real strength, though, lies in its ability to produce space-saving graphics that retain their original high-quality look. It does this well, and will enable even the greenest of web designers to produce graphics and menu elements that lend an air of quality previously only available to those who could afford the services of a professional developer.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price *Price £239 (£203.40 ex VAT)*
Contact *Macromedia 0181 358 5857*
www.getfireworks.com
Good Points *Easy to use. Logical interface. Impressive results using the minimum of web space. 30-day free trial on the net.*
Bad Points *Don't expect it to produce your whole site for you.*
Conclusion *A must-buy product for anyone serious about web design.*

Sonic Foundry Acid

This music production tool with editing facilities and a wide selection of samples is a real breakthrough.
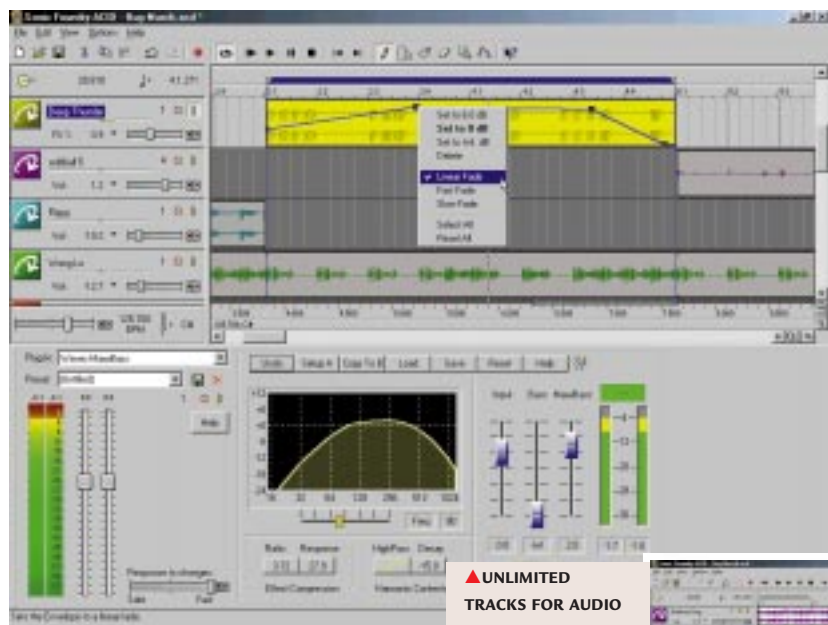
Acid is a breakthrough loop-based music production tool. Its concept and approach to making music is entirely new. It enables users of all skill levels to produce high-quality, royalty-free music from a wide selection of audio samples. What sets Acid apart from any other multi-track audio recorder with editing facilities is its ability to recognise the key (pitch) and tempo (speed) of any audio sample and then make it "fit" musically within an arrangement. If you have worked with audio samples in the past, you'll appreciate how time consuming this can be using traditional pitch-shifting and time-stretching processes. Moreover, these processes may not always yield high-quality results. With a mixed bag of

PCW DETAILS

★★★★

Price £249 (£212 ex VAT)
Contact SCV London 0171 923 1892
www.sonicfoundry.com/acid/
System Requirements *133MHz Pentium, 32Mb RAM, Windows 95 or NT. Pentium II recommended for real-time effects.*
Good Points *Easy to use. Flexible. Multi-I/O support. Comprehensive syncing. Stable.*
Bad Points *Response from plug-in effects is slow. No scissors tool.*
Conclusion *A simple yet powerful audio package with plenty to offer every type of user.*

▲UNLIMITED TRACKS FOR AUDIO SEQUENCING, WITH SUPPORT FOR MULTIPLE SOUND CARDS
▶A VOLUME ENVELOPE BEING ADDED TO AN AUDIO REGION. IN THE LOWER HALF OF THE SCREEN, WAVES' MAXXBASS AUDIO PLUG-IN IS BEING USED TO MAXIMISE BASS OUTPUT

samples loaded into an arrangement, piecing a tune together simply involves selecting the pencil tool to "paint" elements on to a musical canvas. Acid takes care of the technicalities; all you need is an ear for what sounds good. The installation takes up only 5Mb of disk space for the program files. On the CD there's over 500Mb of audio samples (pop, rock and dance) to kickstart your collection.

The main screen is divided into three areas: track view, track display and a multi-function window. Tabs in the bottom right of the window allow you to view the Media Explorer, file properties, audio mixer and up to eight DirectX plug-in effects. Acid's Media Explorer works in much the same way as the Windows Explorer, showing the available drives and folders in a tree structure. With the File Preview option enabled,

audio files can be auditioned in context with the tune on which you're working. Double-clicking the file creates a new track for the sample and the pencil tool can be used in the track display to paint the sample into place. Once a sample reaches its end, it loops back to the start, enabling you to carry on painting.

Audio files are played back according to criteria set in the audio properties view. These include whether or not a sample should be time-stretched and/or pitch-shifted to match the key and tempo of your arrangement, and whether files should be played from hard disk or loaded into RAM. Despite being flagged as a loop-based production tool, Acid will also work with single-shot samples, or non-looping material. Saving a file with these settings is known as Acidizing and all the audio samples on the CD come pre-Acidized ready for use. A multi-function slider in the track view lets you alter settings for volume, pan and effect send levels. The effect sends are configured as pre-fader, which allows insert-type signal processors to be used on individual tracks. Settings can be automated throughout a mix by superimposing envelopes over audio regions. Linear and logarithmic curves are available. The key and tempo are configured globally with the tuning fork and BPM slider, and markers can be placed above the timeline to change these at any point.

The concept is simple but Acid can be used to create complex mixes with the minimum of fuss. The time-stretching and pitch-shifting algorithms are among the best I have come across, and with support for multiple-output sound cards, Acid is well-suited to more professional applications that may require external mixing and processing.

STEVEN HELSTRIP

London Access

London Access makes finding your way around the capital almost instantaneous.

You can usually spot a tourist in London because his rucksack will contain a brand new London A-to-Z which is furtively consulted on street corners. Indigenous Londoners, on the other hand (on anything but their commuter run) may have a battered copy sticking unselfconsciously out of their jacket pocket because they understand that almost no-one, apart from London cab drivers, can carry the knowledge in their heads.

London Access provides what is essentially the equivalent to a London street map, but with a major difference. Instead of the index in the back, it has an electronic finder. As you begin typing a street name, it will display a gradually diminishing list of streets that match the characters you are typing. As soon as you see the one you want, you can select it and the pointer on the map will jump to the correct location. The "find" is almost instantaneous on an HP 620. You can
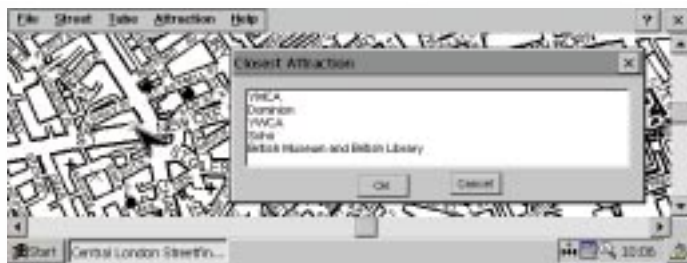
◄ **FIND YOUR WAY IN LONDON, FASTER THAN A SPEEDING BULLET**

also search for "attractions" such as museums, theatres and so on, and there is a useful option to find the "closest attraction" to your selected street. One minor gripe is that the map doesn't cover all of London and not even as much as a printed A-to-Z. For example, going east, it peters out around Whitechapel. So, oddly, the built-in London Underground planner knows all the tube stations, even if the map doesn't show where they are. Nevertheless, this is a minor gripe compared to the advantages. If you already have a Windows CE machine, buy London Access and sell your A-to-Z to a tourist.

MARK WHITEHORN

Inspire 3D

With this light version of LightWave 3D, aspiring animators will be able to create and manipulate objects with ease.

This is the latest 3D package from NewTek, famous for its LightWave 3D, one of the most versatile high-end software packages in computer animation. It has been used to create some of the most memorable special effects in Hollywood blockbusters like Titanic, Starship Troopers and Lost in Space.

Inspire 3D is a "lite" version of LightWave, boasting about 90 percent of its features. Like LightWave, Inspire 3D is split into two applications: the Modeller and Layout (renderer). Modeller is the application used to create objects. Manipulating 3D objects in the Modeller is slightly different from touching up 2D pictures in more common image-editing programs like Photoshop. This is because a 3D object has three axes and all three must be manipulated. The Layout tool is the application used to create the surface texturing of objects. For instance, if the 3D object created in the Modeller were a ship, you could add

◄ **USE THE LAYOUT TOOL TO CREATE SURFACE TEXTURES**

surface textures such as metallic hull plates, wooden boards for the deck and glass cabin windows. Rendered scenes can be animated by specifying a series of key frames. The software takes care of rendering objects in between each of the key frames, creating a fluid animation. Inspire can render still images up to a resolution of 8000x8000 pixels, but animations are limited to 640x480, to prevent its use in professional TV or video work. Inspire 3D also lacks support for multiple processors. But even considering these limitations, it's still a versatile animation package.

AJITH RAM

RealPlayer Plus G2 BETA

Useful improvements for an already excellent multimedia streaming software product.

Real Networks continues to tweak its multimedia streaming software. Beta versions of the various components of RealSystem G2 are available at the company's web site, and Real Networks is continuing its practice of giving away the basic Player and charging for the more sophisticated Player Plus software.

Web authors can now stream two new datatypes, RealText and RealPix, that allow high-resolution pictures and scrolling text to be streamed along with RealVideo and Audio. Real Networks claims that its SmartStream technology can eliminate rebuffering by improved communication between client and server: the bandwidth can switch between settings of 14.4K to 56K according to the client bandwidth and

▲ **THE REDESIGNED REALPLAYER INTERFACE**

subsequent packet loss, thus minimising rebuffering. You will only notice this difference, though, if the author of the page has used the RealSystem G2 to encode the Real file, so it should be a while before the long-term benefits are felt. Other, more tangible improvements are to be found with the redesigned interface. The Plus version offers one-touch channels and picture-quality controls are now included, as well as a 10-channel graphic equaliser. These are useful improvements to what was already an excellent product. But as the software becomes more ambitious, the more it exposes limitations in the delivery medium. So, until there is a delivery system capable of transferring megabytes per second, the RealPlayer Plus is as good as it gets.

PAUL TRUEMAN

PCW DETAILS

★★★

Price *US$29.99*
System Requirements *Windows 95/NT, P133, 16 Mb RAM.*
Contact Real Networks **www.real.co.uk**
Good Points *User-friendly. Lots of options.*
Bad Points *Still struggles to play decent video at 56Kbits/sec.*
Conclusion *Miles ahead of the competition but limited by bandwidth*

Truster 2.40

With your very own lie detector machine you may never again fear telesales canvassers.

Five double-glazed windows for the price of one sounds too good to be true, but how can you be sure when you get cold-canvassed at the end of a busy day? Originally designed for counter-terrorism, Truster is now available to the public and could well help you to decide. The main requirement is a phone with a standard receiver base. The receiver is plugged into a splitter box, one cable from which is put back into the receiver socket on the phone base while the other goes to the sound card. The software samples voices at the beginning of each conversation to calibrate itself before passing judgement.

Analysis is shown as a series of graphs, with a text judgement ranging from "Truth" to the rather more incriminating "Outsmart" or "False Statement". It does this by measuring the changes in the speaker's voice, as a lie induces a

▶ **'I'LL RING YOU BACK... HONEST'**

slightly increased pulse which draws blood away from the vocal chords. In most of our tests we found its results to be fairly reliable as long as an unsuspecting subject was telling fairly serious lies. Once we confronted our callers and they began to backtrack, Truster cleverly warned us that what we were hearing was "Avoidance/Voice Manipulation". We were a little concerned that when we ran the same lengthy recorded message through Truster several times, it gave different judgements on each occasion, throwing some doubt on its claim of 85 percent accuracy.

NIK RAWLINSON

PCW DETAILS

★★★

Price *£111.63 (£92 ex VAT)*
Contact *Hundred Islands Technologies 0171 720 3555 www.truster.com*
Good Points *Easy to use. Gives a unique slant to conversations.*
Bad Points *Expensive. Should only be used as a guide.*
Conclusion *Fun, but potentially insidious. For entertainment only.*

3Com PalmPilot Pro &
Desktop for Windows

Tested over six months

Keep your PC and organiser in perfect harmony as the last paper bastion takes it on the chin from this little beauty.

My old but trusty paper personal organiser had taken on a rather battered appearance some time earlier and was well overdue for replacement, but the small or non-standard keyboards on most Personal Digital Assistants (PDA) had always deterred me from "going digital". Six months ago, though, the unthinkable happened. Who knows? Maybe one day I'll find my organiser and I'll be able to look back on the whole episode and laugh; at the time, though, it was anything but funny. But there is a silver lining to all clouds and in this case it took the form of the PalmPilot Pro, which replaced my little black book.

Pocket-sized (8cm by 12cm and 1cm thick), the device has a large LCD for both display and input. A stylus, that slips neatly into the body for storage, is used to enter information either by tapping on a small representation of a QWERTY keyboard (which easily switches into a numeric keypad) or via the handwriting recognition area of the screen. The latter requires characters to be drawn in a particular way and although I wondered how practical this facility would be, text entry can be mastered swiftly and 100% accuracy is possible with just a little practice.

The built-in software includes a standard suite of address book, diary, notebook, To Do list and calculator. A game which lets you practice handwriting input, an email client and an expenses record are included, clearly indicating this is a product aimed at businesspeople. What makes the PalmPilot stand out is the HotSync utility which enables the records in the PalmPilot to be synchronised with those on a desktop

Text entry can be mastered swiftly and 100% accuracy is possible with practice

PC and vice-versa. Having installed the software, the PalmPilot Desktop, and connected a cradle to a serial port on the PC, synchronisation is achieved by pressing a button on the PalmPilot. The Desktop software mirrors the suite on the PalmPilot and data can be entered on either device. The HotSync process can be tailored to your needs and a number of options are offered, ranging from overwriting the records on one machine with those on the other, to merging all of the records and updating both. One drawback is that add-on software is needed to HotSync with systems other than the PalmPilot. That said, interfaces for all common PIMs appears to be readily available.

I tend to judge how good a piece of software is by how far you can get before having to refer to the instruction manuals. In this respect, the PalmPilot scores well. The software and communications link between PC and PalmPilot installed easily and the user interface is intuitive, offering more than just a functional front-end for the PC.

The PalmPilot Desktop is closely integrated with Microsoft Office, enabling data to be exported to MS Word, MS Excel or the system clipboard by dragging the required data on to an icon. Macros offering a variety of formatting options are included to make exporting data easy; addresses, for example, can be used in a mail-merge or to produce labels. Emails can be prepared on the PalmPilot and, following synchronisation, are ready to be sent from the PC. For those who really need to be able to communicate on the move, a PC is not essential and a modem can be
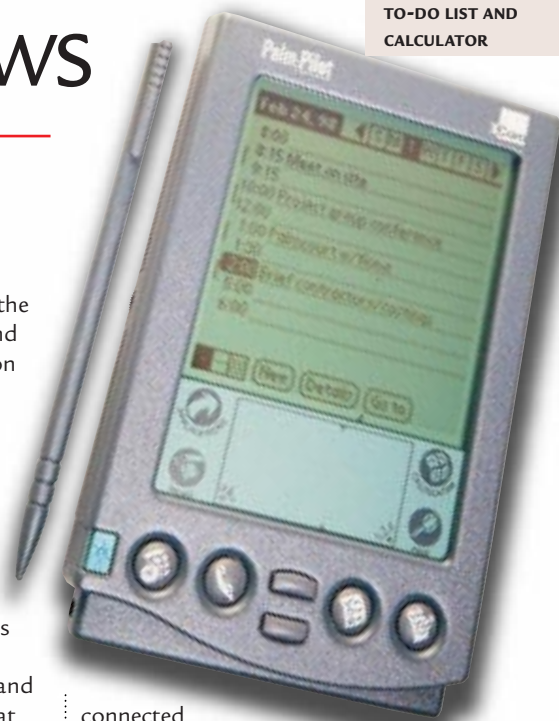
connected to the slot used for HotSyncing. Despite the lack of support for Outlook, the PIM and email client supplied as part of MS Office, the PalmPilot and its Desktop email system are well integrated with MS Exchange.

The acid test for any gizmo, though, is whether it ends up gathering dust on a shelf somewhere, the novelty having well worn off. Well, six months on, the PalmPilot is still with me. There are times when it would be nice to be able to jot down a quick note on paper, but this drawback is far outweighed by the benefits of being able to swap and synchronise my personal information between PC and Organiser. And, you know, there are some rather neat little accessories you can get for it, too...

GARY BEATON

PCW DETAILS

★★★★

Price *About £160 (£136.17 ex VAT)*
Contact *Infoline 0800 225252*
www.palmpilot.com
Good Points *You can ensure that your Organiser diary says the same as your PC.*
Bad Points *Needs a spare serial port to link to a PC. The handwriting recognition may not suit everybody.*
Conclusion *A convenient and practical replacement for the paper personal organiser.*

Demon Internet

Tested over three years

Demon takes the devilment out of the net, providing an inexpensive, quality service.

I migrated to Demon Internet three years ago after a couple of years online with CompuServe. I was spending more and more time on the web — expensive, with CompuServe fees added to the phone bill. I subscribed to both services for a while but couldn't justify the cost and opted to go with Demon, which seemed in the vanguard as the web developed.

I noticed immediately the faster WWW service from Demon — and missed the excellent moderated CompuServe forums. I still think CompuServe Forums are better than Usenet groups. Moderation in all things is my motto. With Demon I noticed how techie it all seemed compared to CompuServe. I have needed to use telephone support lines very few times in my years online. CompuServe were friendly and helpful; Demon *tried* to be helpful but were plainly exasperated by my relative lack of know-how. (I was renting some commercial web space and unsure how the system worked.) Since then I've solved my own problems, so it's been good for me in the long run.

Three years is a long time in comms, though, and these days Demon are pure pussycat, I'm told. The Demon service is volatile. I was tempted to say diabolical, but my sense of fair play overcame my love of cheap jokes. Sometimes email is received and posted in a flash. Other times the mail system seizes and times out. Sometimes I just give up and try again later, but it can be very frustrating. Just like the Post Office, in fact. I can usually connect first go but am frequently informed that "the remote server has unexpectedly closed the connection". It's one of the net dilemmas: you never know whether your ISP is at fault or something has trashed your settings. But a friend suffers the same frequent cutoffs, so it's probably Demon. The Demon Web connection seems as fast as any other. I've worked at large companies where even a dedicated line doesn't improve access.

The bottlenecks are many — and mostly lie further out in the net. I've found the 5Mb of free web space useful. As a professional photographer I have my portfolio on-line; so far it's brought me in £700-worth of work. Not a fortune, but bear in mind that my Demon subscriptions from day one have amounted to less than £500. The amount of free space is now 15Mb, which is ample for most people. There are limitations, of course. You can only run a Demon supplied CGI, which amounts to forms and hit counters, basically. But you can have RealAudio, so your home page can not only show your public how wonderful you are, it can tell them, too.

Which brings me to a gripe. I run an online Theatre, The Surrey Stick Figure Theatre of Death www.c-cat.demon.co.uk/theatre/. When I wanted to publicise it, I sent a four-line note of its existence to 25 humourous newsgroups. This was a small representative selection of the humour groups on Usenet, there was no commercial interest involved and it was strictly relevant to the groups' interests. Demon promptly closed down my site for excessive cross-posting — 25 from 26,000 newsgroups! The site was reinstated after emailed, faxed and snail-mailed apologies. If ever you hear ISPs bleating on about freedom of speech, remember they are quite happy to act as both prosecution and judge to stifle it themselves — and with no right of appeal.

All in all, for a tenner a month you can't go wrong. Demon have been around a long time (by ISP standards), and they run a superb web site at demon.net. I believe they are now distancing themselves from their techie past and becoming a more consumer-based service. Their new "fax by email" service and *Demon Dispatches* magazine show the trend, which will be hastened by the Scottish Telecom takeover.

DAVID THORPE

All in all, for a tenner a month you can't go wrong

PCW DETAILS

★★★

Price *£10 per calender month (£11.75 inc VAT)*
Contact *Demon Internet 0800 458 9666 www.demon.net*
Good Points *Local call access, free web space, comprehensive service.*
Bad Points *Occasional email seizures, dropped connections.*
Conclusion *As good as any, better than most.*

Packard Bell Executive PC

Tested over thre years

Technology shifts greatly over three years, but a solid PC won't let you down.

Three years ago, technology was at the early Pentium stage and prices were not too savoury. It was at this time that my mother took me to Curry's to get a computer. The final decision was a Packard Bell multimedia system. It was based around a Socket 5 P60, with 8Mb RAM, a quad-speed CD-ROM drive, and a 504Mb hard disk. It came bundled with multiple pieces of software, most of which showed off the then high-tech hardware.

▼ **A PERFECT PC FOR THE FIRST-TIME BUYER**

Windows for Workgroups 3.11 was the standard operating system, with DOS 6.22 underneath. There was no modem or any backup device as seen in similarly-priced systems. The hard-drive had more than enough room for Office, and only started to struggle when Windows 95 was installed. Inside, the case it was a bit of a mess. The processor was placed close to the fan, but this didn't provide adequate ventilation as it frequently overheated and crashed. Recent installation of RAM passed easily, as two of the four SIMM sockets were not covered up by anything. The monitor was a 14in model with a maximum resolution of 1024x720 at a flickery 60Hz. The colour is, to this day, even and crisp.

The Packard Bell Executive PC has served us well for the past three years, and has taught me lots about computing. Its original price of £2000 included a Canon BJC-4000 bubblejet printer, the quality of which was not great but was certainly adequate. One of its few down points of this system is that it is not upgradable without purchasing a new motherboard.

PAUL O'NEILL

PCW DETAILS

★★★★

Price *The Pulsar range starts from £1,099 (£935.32 ex VAT)*
Contact *Packard Bell 0990 500049*
Good Points *A very reliable PC.*
Bad Points *Expensive to upgrade.*
Conclusion *A solid buy.*

Acorn Risc PC600

Tested over four years

If reliability is what you look for in a PC, you will have to trade off a little flexibility.

When I first heard of the Risc PC600 back in 1994, I instantly wanted one. For around £1000, it offered 24-bit graphics, stereo sound and an operating system kept securely in ROM. It was also the first of Acorn's RISC machines with a slot for an Intel-compatible processor, allowing Windows-based software to be run at an acceptable speed. Acorn broke with its past by trying to make the Risc PC
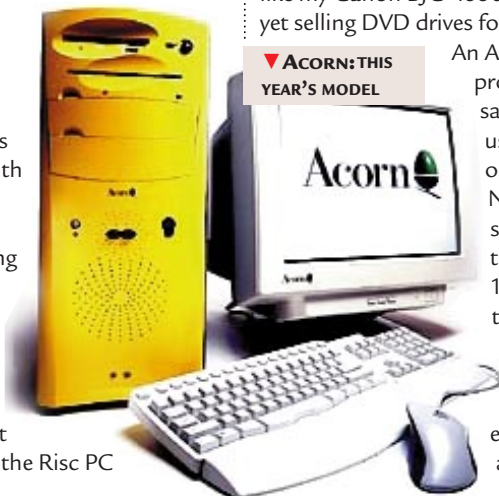
▼ **ACORN: THIS YEAR'S MODEL**

use industry-standard hardware rather than with its own proprietary designs. Thus, the Risc PC uses standard SIMMs, the keyboard uses a PS/2 connector and, with an adaptor, ISA expansion cards can be used. However, increasingly, the Risc PC has been unable to keep up the pace with PC developments: Acorn's printer drivers do not currently support Photoreal printers like my Canon BJC-4550 and no-one is yet selling DVD drives for the machine. An ARM600-series processor, the same series as used in the original Apple Newton, came as standard with the Risc PC. In 1996, I upgraded this with a 202.4MHz StrongARM processor; the effect was an approximate

seven times speed increase, and made the Risc (on paper) significantly faster than any Intel-based PC, albeit only for a few months.

Risc OS 3 has never been widely used outside of education. But, despite the launch of Window 95 and 98, it remains a capable alternative. Being stored in ROM, it never requires re-installing. Also, the OS rarely crashes. It might not be widely used; but, hey, at least it works.

ALEX SINGLETON

PCW DETAILS

★★★★

Price *Risc PC600 discontinued. StrongARM version around £800 (ex VAT) on the street.*
Contact *Acorn Computers 01223 725000 www.acorn.com*
Good Points *Reliable OS and PC co-processor.*
Bad Points *Lack of drivers and software.*
Conclusion *It's a lot more reliable than a Windows-based machine.*

The burgeoning low-end PC market is the **latest arena for competitive retail giants** — and now Tesco has jumped in. George Cole talks to PC World marketing director, Nicholas Cadbury, and Tesco product development manager, Ian Sinclair, about retailing and off-the-shelf PC prices.

Checking out the cheap end

LAST SUMMER, SUPERMARKET GIANT, TESCO, ENTERED THE HOME **PC MARKET.** Following sales trials of Siemens-Nixdorf PCs at its store in New Malden (where customers could buy one for £679) Tesco began selling higher-priced and higher-specified Siemens-Nixdorf PCs at its stores in Banbury, Gloucester, Brookfield, Brent Park and Twickenham, and is now selling Fujitsu PCs . It is no coincidence that Siemens-Nixdorf supplies Tesco's back-office system, and Fujitsu, the company's mainframes.

Lower-priced PCs are not new but whereas these have tended to be obsolete or end-of-line products, Tesco's machines offer a good specification, including a large hard drive, Pentium II processor, lots of memory and useful pre-installed software (*see the panel on p126*). Tesco also sells Lexmark printers in several stores, and is now even an ISP through its TescoNet service. Shortly after, the computer superstore PC World, which has 56 stores nationwide, announced two, new, lower-priced PCs at £599 and £699 — and neither were these low-end machines.

Vendors have seen the deals that are being offered in THE SUPERMARKETS IN EUROPE; they see enormous potential and we've been able to take advantage of this

We talked to Ian Sinclair, Tesco's product development manager for PCs and peripherals, and Nicholas Cadbury, PC World's marketing director, in a head-to-head interview. Many issues were covered, including whether UK PC prices were too high, whether software prices are likely to fall, and even what the PC of the future might look like.

Is a supermarket the ideal place to buy a PC?
Ian Sinclair: We believe it is. It's the simplicity of it — there's someone in-store to whom people can talk, the PC is at a good value price and it's a brand name. One of our criteria was that we had

to have the right level of expertise in the store and so the assistants selling the PCs have been supplied by the vendors, Fujitsu or Siemens-Nixdorf. Our customers have spoken; by buying the PCs.
Nicholas Cadbury: We don't believe it is. The customer segment and the market is fairly wide and it is important to offer a choice of product. Customers are not just looking for a box, they're looking for solutions. There is a variety of PCs which can offer different things. We think price is important but so, too, is service — and we don't just mean the person selling you the product. The ongoing relationship is important, too. Our customers don't just visit us once and then go elsewhere. They come back time and again to upgrade their PC and buy add-ons, and that's where the specialist company comes in. They also want the after-sales support to come from the store that sold them the PC — not someone else.
Ian Sinclair: After-sales care is important to us, which is why we offer an assisted install service with the price of the Fujitsu, and this will be part of our future services. We also offer on-site repair. I think this is a big market and that there are a lot of people out there who don't have PCs, but do want to buy them. It's parents who want to get their kids on the internet or who see their children using computers at school. There's room for everybody, it's all about offering more choice to consumers.

Is there enough competition in the PC retail sector?
Nicolas Cadbury: There's Dixons, Currys and PC World, but there are also others such as Tesco coming into the market. But the main competition we see is from the direct chains such as Time, Tiny, the Dells and Gateways. PC World doesn't just sell PCs to the home market, a fair chunk of our customers are from the SoHo [small office/home office] and SME [small to medium enterprise] sectors, and we don't think these people are going to other retailers.

Ian Sinclair: Customers have asked for our service. People have said they want to buy a PC at their local [Tesco] store. In New Malden, some people were buying six to 15 PCs for their small business. People come into our store, buy them and use them — and if they don't like them they can bring them back because Tesco offers a no-quibble guarantee.

Who are your target customers?
Ian Sinclair: We've only been doing this for five weeks, but from what I've seen, there seems to be three different types: those who are new to the PC market, people who have bought a PC before, and those from the smaller business sector who are buying systems for their office.
Nicolas Cadbury: We go across the board, from new entrants to SMEs. Dixons and Currys tend to cater for the new and the family PC while PC World caters for the slightly more experienced purchaser. SoHo and SME buyers are looking for more than just the purchase of a PC but also

getting it fixed into an office, upgrading software and so on.
Ian Sinclair: We're looking at how we can move this forward. We already sell printers in some of our stores and we believe that TescoNet offers one the best ways of getting onto the internet. We may well extend our range of peripherals.

Is buying a PC the same as buying a fridge or a TV?
Nicolas Cadbury: I wish it were! It's getting closer in terms of price, which is good for the consumer, but a PC is a much more complex product. A fridge simply keeps your food cold but you can do so many things with a PC, from playing games to doing your business accounts. PCs need upgrading and feeding with consumables and peripherals. PCs are becoming more plug-and-play but the technology moves so fast that you need to be able to explain this to your customers.
Ian Sinclair: We sell TVs at Tesco, but not fridges. The key is to have a good post-sales package, with a telephone helpline, after-sales care and so on.

How can you afford to sell PCs with these specifications at these prices?

Nicolas Cadbury: It's a competitive marketplace and, because of the size of PC World, we have been able to get our product at competitive prices.

Ian Sinclair: We've worked with our suppliers to get what Tesco feels are the right margins. We have the buying power, too. Vendors have seen the deals that are being offered in the supermarkets in Europe; they see enormous potential and we've been able to take advantage of this.

Are these PCs loss leaders?

Ian Sinclair: Tesco believes we are making reasonable margins, comparable to our other products. Our suppliers are making reasonable margins, too.

Nicolas Cadbury: PC World also makes reasonable margins. It doesn't mean we are making very large margins on a £1,200 PC, because there is a lot of competition from the direct marketers for higher-priced PCs. So it's tough.

What effect will these lower-priced PCs have on the home market?

Nicolas Cadbury: We see it as a good thing. The home PC penetration in the UK is about 17 to 20 percent compared with about 28 percent for Germany, so there's a long way to go. These PCs will increase penetration and also give people an opportunity to buy a second PC for their home.

Ian Sinclair: This is going to get a lot more people into the market. PCs have got simpler thanks to Windows 98 and plug-and-play. It's getting easier to get onto the internet and the PC is becoming an everyday object.

Are UK home PCs over-priced compared with the US and other European countries?

Ian Sinclair: At Tesco, we have been told by Siemens-Nixdorf and Fujitsu that UK prices are more expensive than in Germany or France. A *Sunday Times* survey showed that the average UK price is £1,189, in France it's £1,093, and in Germany £922. Judging by these figures, I would have to say "yes".

Nicolas Cadbury: It depends on what you're measuring. All I can say is that our average prices are not as high as this, so someone must be over-

▲ **PC World's Cadbury says it's important to offer a choice of products, as his customers are not just looking for a box, they want a solution**

Why have you launched PCs at these prices?

Ian Sinclair: We wanted to get a good value package. We didn't want to put PCs into Tesco stores at very high prices. A PC is not an impulse purchase, so we made sure our PC had a modem and used a Pentium II chip. We didn't go into PC World and see what price they were selling at. Neither did we carry out market surveys of high-street prices.

Nicolas Cadbury: Tesco has brought in a product at this price level, but at PC World we aim to be competitive across all levels. We've launched our Advent brand, which is aimed at the second-time buyer. The £599 and £699 PCs are

> **Prices are likely to come down, but the rate at which they do so will slow. THERE WILL BE A £399 PC** but it won't do as much as one costing £599

part of our strategy. We saw a gap in the market for people who would like to own a PC but could not afford to buy one. PC prices have fallen throughout the world, so we can buy at a good price and sell at reasonable margins. The opportunity came to us — it wasn't a response to whatever Tesco was doing.

charging. You have to look at what you're getting. Germany is a more mature market, so users want a straight PC — are they getting a monitor with it?... and what's the VAT rate?... what's the exchange rate? There are a number of variables to consider. I'd say we're fairly well priced when compared with the US — you have to look at the total package.

Do you expect PC prices to get any lower?

Nicolas Cadbury: Prices are likely to come down, but the rate at which they do so will slow. There will be a £399 PC, but it won't do as much as one costing £599.

Ian Sinclair: You're going to reach a limit where they can't get any lower, but we're not there yet. The physical components inside a PC will be the limiting factor but, as I said earlier, I think there's scope for an even lower-priced PC.

Does buying a lower-priced PC mean sacrificing after-sales care?

Ian Sinclair: At Tesco, we offer a year's telephone support, while others offer only 30 days. We have a 1-year on-site repair service, and there's assisted install. We won't compromise our customer service. If we have to do more for our customers, then of course we'll do that. But it may mean that we need to offer these extra services as an option from which the customer can choose.

Nicolas Cadbury: After-sales care is a very important part of PC World's business. We have 200 people out on the road making repairs. Last year, our telephone helpline took 1.5 million calls. It's a 24-hour service. We achieve 4,000 visits each week. So, the answer is that you don't have to sacrifice support at these prices.

Are we likely to see software being sold at lower prices?

Ian Sinclair: We already sells budget software...

But what about top-end packages like Microsoft Office?

...At Tesco, we are looking at this but at the moment we have no plans for that. But if that's something our customers want we'll see what we can do about it.

Nicolas Cadbury: I don't see them falling, unless our suppliers are going to do something about it.

▲ STACK 'EM HIGH AND SELL 'EM CHEAP — £799 FUJITSU PCS ON SALE AT TESCO. JUST THINK OF ALL THOSE CLUB CARD POINTS!

The margins we make on software at PC World are reasonable and we can't see the prices getting any lower.

Should people expect to upgrade their PC every 18 months?

Nicolas Cadbury: It depends on what you want to do with it. You could buy a PC for five years and never have to upgrade it. If you buy a family PC, you may wish to do different things with it as the kids grow up, so you will eventually want to upgrade.

Ian Sinclair: It's about consumer choice. If people want to upgrade, they will. People are not throwing away PCs, they're ending up in the kid's room — or rather the other way round!

Will today's PCs still be around in the same format in a decade's time?

Nicolas Cadbury: The digital TV set-top box is coming and if there's a market for them, PC World will sell them. I think the basic PC format will still be around, we'll just do different things with them, like networking from home.

Ian Sinclair: There's a desire for knowledge. When people see what you can do with a PC, it will encourage them to buy one. Today, you can find out the best train times by going to the Railtrack website rather than ringing them up. This type of service will drive the market. My only concern about set-top boxes is that they will have to be simpler to use than a VCR!

TUCK 'EM IN YOUR TROLLEY

At Tesco:
Fujitsu T-Bird Price £799 (inc VAT). 266MHz Pentium II chip, 32Mb RAM, 4.3Gb hard disk, 24X CD-ROM drive, 56K modem, 15in monitor, sound card, speakers, microphone, headphones. Includes Windows 98, Microsoft Works

for Windows 95, and Microsoft Word 97 pre-installed.

At PC World:
Contessa 233 Price £599 (incl. VAT). Includes 233MHz Pentium MMX processor, 32Mb RAM, 2GB hard drive,

24X CD-ROM drive, sound card, speakers, 14in monitor, Windows 98. **Advent K300+** Price £699 (inc VAT). AMD 322MHz K6 processor, 32Mb RAM, 3.2Gb hard drive, 32X CD-ROM, 33.6K modem, 15in monitor. Windows 98 and Lotus SmartSuite pre-installed.
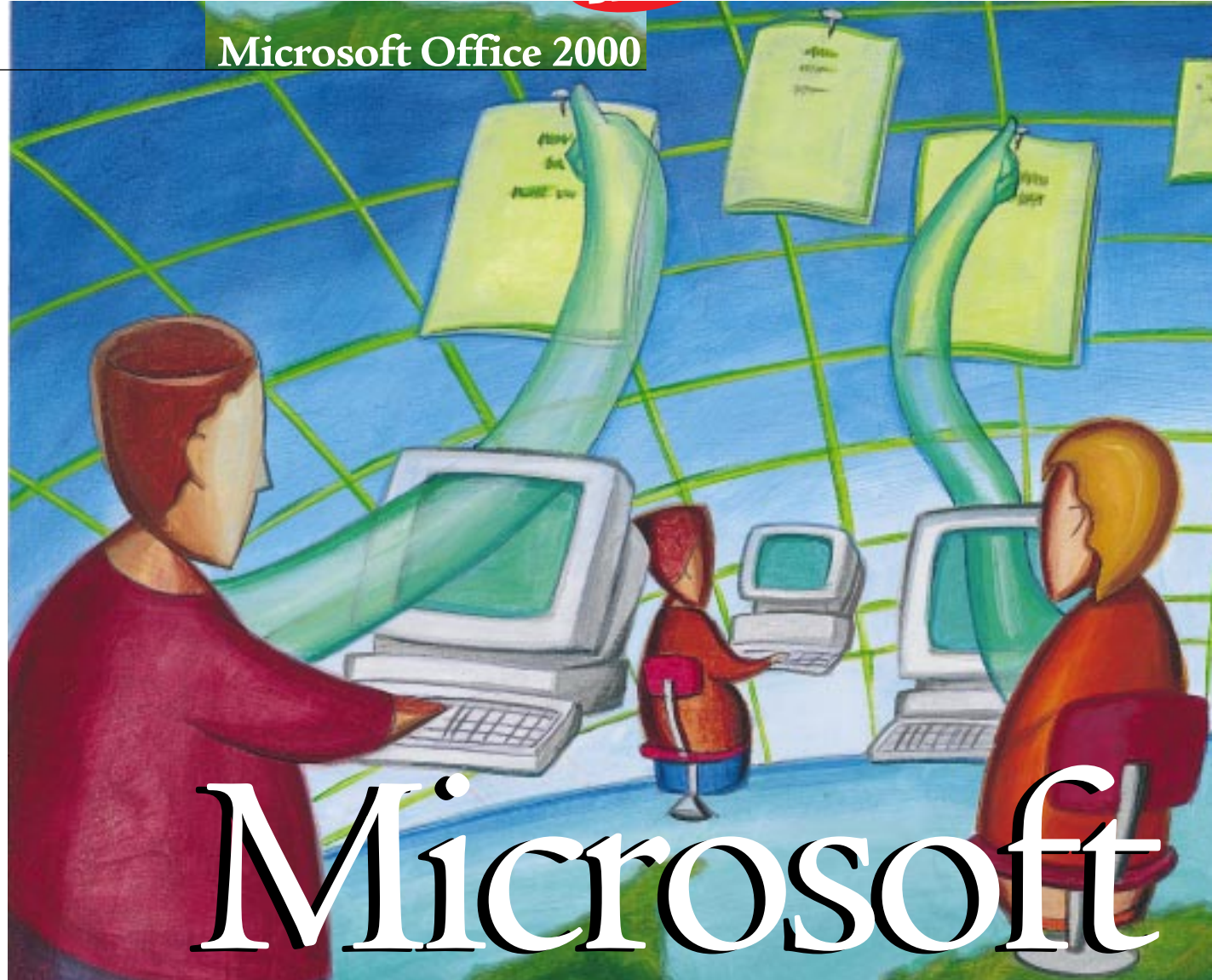
Microsoft

NOT ONLY IS OFFICE 2000 SIMPLER FOR THE USER, WITH MORE FUNCTIONAL AND FLEXIBLE SOFTWARE, BUT ITS APPEAL TO COMPANIES HAS BEEN ENHANCED, TOO. TIM NOTT PREVIEWS THE BETA RELEASE.

Contents

I**T HASN'T YET BEEN GIVEN AN OFFICIAL LAUNCH DATE, BUT MICROSOFT OFFICE 2000 SHOULD APPEAR IN EARLY 1999.** In August, 20,000 copies of Beta One went out to testers. So what has Microsoft been hoping to achieve with this release? The company is aware that 75 percent of all Office sales go to large organisations, and its first priority has been to reduce the total cost of ownership (TCO) by making installation, maintenance and user support easier. The second goal has to do with enhancing what Microsoft terms the "digital nervous system" of a company. In other words, the way in which information is distributed and accessed.

Although this approach might seem very "top-down" there is considerable end-user benefit in both directions. Taking the logical first step of installing the product, there are some welcome changes. Language has been a global issue for this release. There are now single language-independent executables for the main components instead of the previous 36 versions, with DLLs providing specific needs such as menu and dialog languages. This in itself should

contribute to minimising TCO for multinational organisations. It also means that different users can log-in to the same machine and work in different languages. And, with "Roaming User Profiles", visitors to other departments or branches of a networked organisation can download custom settings from a central server.

Complementing this is a Profile Wizard that allows a user's settings to be backed up and transferred to a new machine or location. Instead of buying extra proofing tools on a per-language basis, there will be just one language pack to buy, which will incorporate them all.

Another interesting innovation is "Install on Demand". If you've ever struggled through the custom install options of any major software package, you'll be familiar with that sinking "do I need this or not?" feeling. Most components now have four options: install to the local hard disk, run from the CD or server, don't install, or install on demand. Choose the last and the component will be visible on menus or shortcuts but the actual installation will be deferred until the first use, when the component will be installed from a server or CD-ROM.

A further, related feature is that of "Self-Repairing" applications. If Office 2000 detects a critical problem with a corrupted file, say, it will reinstall the files or entries rather than just display the traditional error message. Complementing

Office 2000

Martin Jones

this is the "Detect and Repair" tool in the Help menu which provides a similar service for non-critical files such as templates or fonts.

Throughout the suite, Microsoft has tried to "simplify the user experience" and the first evidence of this is the new "Smart" menus and toolbars. Drop a menu and instead of the full, complex, command list a shortened form appears offering the most commonly-used commands. Linger over the menu (or if you can't wait, click the arrow at the base) and the full set appears. If you select one of the hidden commands, this will be promoted to the shortened menu. Unused commands will be demoted, in time, to the also-rans. The toolbars work in a similar way if there is insufficient room to show the full set of buttons, and customising the latter (at least at a basic level) is now a lot easier as each toolbar has a pop-up checklist of the most useful buttons.

The Open and Save dialogs have been revamped, with Outlook-style icons providing shortcuts to the default document folder, Desktop, Web Folders Favourites, which is the same as in Internet Explorer, and History which isn't, but instead is a supercharged version of the Most Recently Used list.

Nestling in the Tools menu is the Advanced Find command which remains as cumbersome as ever. Microsoft's developers assert that this was not improved because "only two

percent of people use it". You can see why — and speaking as one of the two percent marginals it's a shame they didn't see fit to "leverage the web paradigm" and "simplify the user experience" to make multiple keyword searches as easy as using a web search engine. But Microsoft does claim to have improved the natural language query feature but admits that it is advanced users who express the most frustration at this. Anyway, it is now possible to get rid of the Office Assistant completely. Cutting and r dimensions with the introduction of a multiple clipboard.
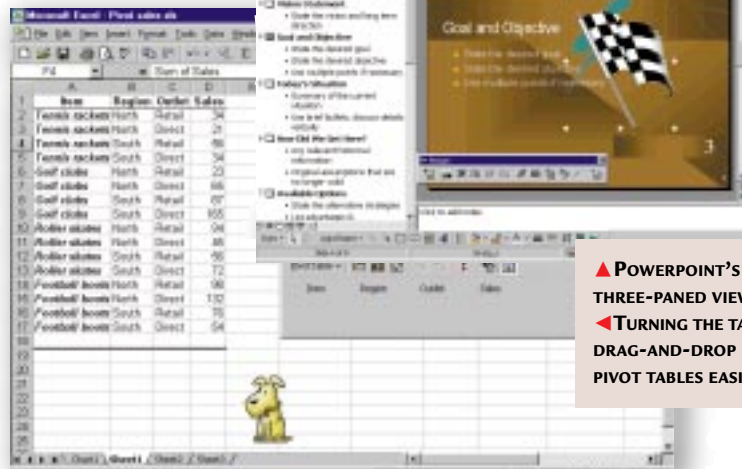
▲ **POWERPOINT'S NEW THREE-PANED VIEW**
◄ **TURNING THE TABLES — DRAG-AND-DROP MAKES PIVOT TABLES EASIER**

Hence the "cyber hunter-gatherer" can choose from up to 12 clips which can be sourced from outside Office, but only pasted into Office documents. One niggling complaint which Microsoft has at last addressed, is in following its own Windows 95 convention of having the document title precede the application on the Windows Taskbar button. So utilities such as WordPad display the document name first on the Taskbar button, while previous versions of Office still obstinately put the application name first, giving you a Taskbar full of buttons which unhelpfully just read "Micr...". In the beta version, though, this has a way to go. If you open multiple spreadsheets in Excel, the Taskbar shows a button for each, just displaying the Excel icon and the document name. Clicking on a button will make that document active within the Excel windows.

However, in Word, things work differently. The Word team has abandoned the multiple document interface (MDI), instead making each document appear as if it were loaded in a separate instance of Word complete with menus and toolbars. In fact, only one instance of Word is in memory. This is not only confusing for those who have grown up with Word's MDI, but also a waste of screen space. If you try to economise by hiding the toolbars in one of the windows, beware: close this document last, and that environment (or lack of it) will have "stuck" the next time you open Word.

Applications

One neat touch in Word is automatic language detection. Type a paragraph in French or German, and Word will recognise this and apply the correct proof-as-you-go tools. Word also has a new Click 'n' Type feature which lets you set alignment and tabs

by double-clicking straight on to the page. Table creation has been improved to include floating and nested tables and at last you can display 24-bit colour images in documents.

The main thrust of improvements in Excel has been in the pivot tables and the new pivot charts. A simple sales spreadsheet might consist of regions by column and product line by row.

> Although it was rumoured that **HTML WOULD BECOME THE DEFAULT FILE FORMAT, THIS IS NOT THE CASE.** The existing binary file formats remain unchanged

However, most real-world data will include other categories which could range from month or salesperson to categorising sales by outlet. Pivot tables let you manipulate this data quickly, to compare, say, sales of golf clubs in department stores in Manchester during the past month with those sold by mail order. A new Wizard simplifies the procedure of setting up pivot tables, with drag-and-drop placement of categories and data. Pivot tables can also be used to mine data from external sources such as OLAP (online analytical processing) providers or SQL servers.

Access (*see p135*) now supports Unicode fonts to allow multilingual versions of applications. **PowerPoint** sports in-place tables, multiple monitor support and animated GIFs. There's a new three-pane view of outline, slide and notes, as well as a general enhancement of "smartness" with text that auto-resizes, multilingual autocorrect, autonumbered bullets and the use of any graphic as a bullet. PowerPoint also ties-in the NetShow and NetMeeting technologies to broadcast presentations over an intranet with streaming sound and video.

▼HUNTING DOWN DATA FROM MULTIPLE SOURCES WITH THE TWELVE-BARREL CLIPBOARD

Microsoft Office 2000

Web stuff

The most interesting new feature, suite-wide, is the new HTML and web support. Although it was rumoured that HTML would become the default file format, this is not the case. The existing binary file formats remain unchanged and compatible with Office 97. The Access file format has changed to support Unicode fonts. In fact, HTML has become a companion format. Though there have been HTML export/import filters in previous versions of Office applications, this version improves things beyond recognition.

The goal here has been "Intranet Democracy". Whereas it has hitherto been easy for users to access documents on a company web site, this has been very much one-way. Converting and uploading documents has been far more difficult and often filtered through official or semi-official webmasters, resulting in information bottlenecks and "dead webs".

The first key feature is "round tripping", and this is where the companion format comes in. Office 2000 uses HTML, Cascading Style Sheets (CSS) and Extended Markup Language (XML) when you save as HTML, and it's the last of these that provides the magic touch. Attributes such as Document Properties or Page Setup, though not visible or supported in standard HTML are preserved as hidden XML objects.

▲ **THE NEW, STREAMLINED, FILE OPEN DIALOG**
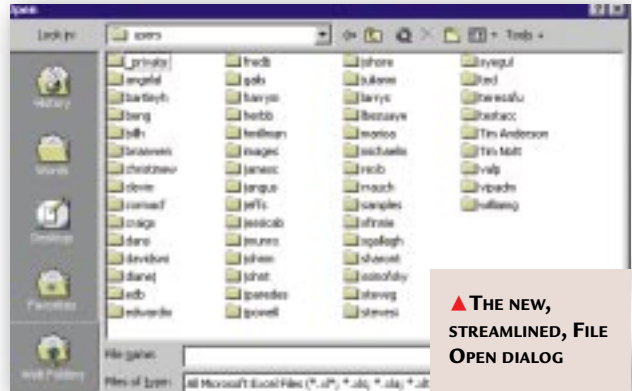
drawings, are converted to .GIF or .JPG bitmaps for HTML display but the originals are also preserved. So, a .DOC file, say, can be saved to HTML then reloaded with no loss of data or formatting. This "round tripping" is transparent to the user. Second comes the concept of Web Folders. Once a user has the requisite permissions, they can save and open documents directly to or from a site (either on an intranet or the world wide web). Again, this is transparent: the Web Folders appear in the new Open/Save dialogs and the process is no different from saving to a local hard disk or a file server.

Both features are designed to empower the end-user, making intranets a truly two-way experience. But there's more to it than just circulating static documents. Documents saved to a Web Folder can host a discussion and comments can be added and viewed either within the application or a web browser. Users can also subscribe to a document and then be notified of changes, by email.

Another interactive trick is Web Components which provide live and working, spreadsheets, charts and pivot tables which can be edited and formatted in Internet Explorer. For those with more ambitious web publishing needs, a copy of FrontPage will be shipped with the high-end version of Office.

Despite the lack of voice input, which in any case faces the twin obstacles of needing powerful PCs and acceptance in crowded offices, Microsoft has done well in addressing its own goals. Both the reduced TCO and the intranet empowerment of end-users are vast improvements that should have everyone rushing to upgrade when the time comes.

Office 2000 vs the opposition

Microsoft is not the only company to realise the importance and growth of corporate intranets. **Lotus** has recently brought out its Millennium edition of SmartSuite, but although the new FastSite component makes it easy to assemble and publish documents to a web site, it doesn't provide the same lossless "round tripping". **Corel's** WordPerfect Suite 8 comes with its WEB.SiteBuilder for creating and organising sites but it doesn't have the seamless HTML companion format of Microsoft.

Speech recognition is conspicuous by its absence in Office 2000. Both major-league suite competitors are already offering this: Corel has partnered with Dragon to bundle its NaturallySpeaking package with WordPerfect Suite 8, and Lotus has parent company IBM's ViaVoice in the box with its SmartSuite Millennium. Both of these offer continuous recognition, so you don't have to pause... between... each... word as with most previous dictation technology. Although there are third-party add-on speech packages for Microsoft products, the company has made no bundling deals. Instead, it is pursuing the grail of speech recognition in-house and at operating system level. So far, this has only seen the light as a part of the Windows CE OS for issuing commands (not dictating text) to hand-held devices and the in-car "hands off" Auto-PC.

PCW DETAILS

Price and availability *to be announced*
Contact *Microsoft Connection 0345 002000*
www.microsoft.com/office/
Good Points *Excellent intranet integration. Round-tripping of HTML and binary files. Lower TCO.*
Bad Points *No voice recognition.*
Conclusion *Microsoft has made a great effort to empower intranet end-users which is bound to pay off.*
Overall Rating ★★★★

Access 2000 & SQL Server 7

The improved Access 2000 comes with many benefits. Mark Whitehorn explains.

A CCESS 2000 COMES WITH SOME REAL BENEFITS, MAINLY FOR LARGE corporations interested in publishing/sharing data across an intranet. But there are some excellent improvements for the developer and home user, too.

Access 2000 is a highly web-aware application. But although HTML is now on an equal footing with the other binary formats, this is not the case in Access. Its approach is to retain the .MDB file as the repository for complete Access applications; all the usual components are still stored there. However, forms and reports can also be published as separate entities called Data Access Pages. These are stored as HTML files outside the .MDB and can be posted as emails or placed on a web site. Data Access Pages
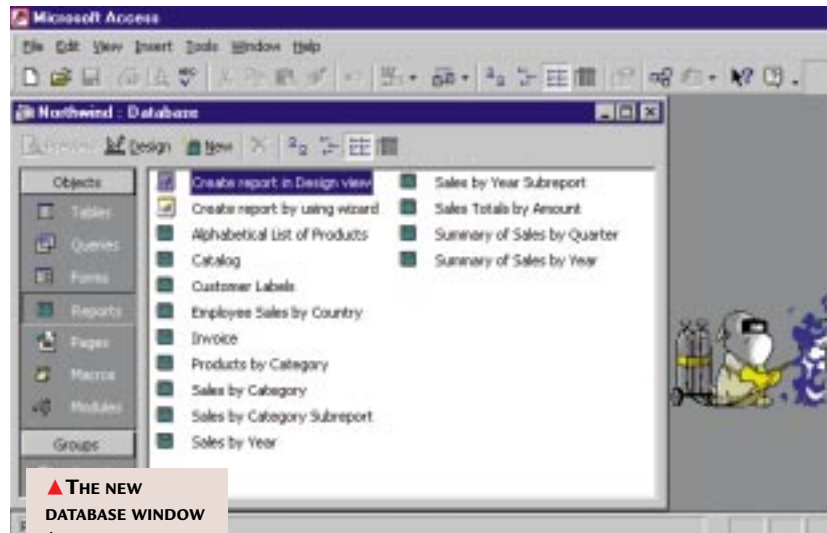
▲ THE NEW DATABASE WINDOW (AND ONE OF THE NEW ASSISTANTS TORCHING SOMETHING, POSSIBLY A BUG)

choose not to use the internal Access database engine, but elect for SQL Server (6.5 or 7) or an internal store available in Office. In either case, a Microsoft Access Project file (.ADP) is created instead of an .MDB file.

Client/Server Design Tools for creating and managing objects stored on the server, and also SQL Server-based Administration Tools for carrying out admin tasks including backing up and restoring a database, and database replication.

Another little something for the developer is the new Name AutoCorrect feature. Now, when a database object is renamed, the change is reflected automatically in dependent objects such as forms and queries. Other features include the ability to print the relationships diagram and the capacity to save Access databases in the format of earlier Access versions. All previous versions appear to be supported: 1.x, 2.0, 7.0/95 and 8.0/97. I couldn't confirm this in the beta but that's what the help system says. This will be useful in organisations with departments and individuals running a mixed bag of versions.

The user interface has undergone changes too, with the central Database Window looking very different. Instead of tabbed pages across the top, the tabs are back where they were in version 1.0 (on the left).

Access 2000 boasts, for the first time in several versions, some real improvements for developers. In addition, the web enablement will make it a boon for large corporations.

> **Now, when a database object is renamed, THE CHANGE IS REFLECTED AUTOMATICALLY in dependent objects such as forms and queries**

...intain a live link to the database, ...owing web clients (using IE 5.0) to view, edit and report on data within the database.

As well as making live data easier to share, Microsoft has opened up an excellent upgrade path, from PC-based to client-server-based operation. When creating a new database, users can

Developers then proceed as usual, using Access as a front-end, so there is no overhead in learning new skills (Wizards have been updated to cope with the changes). The only apparent difference is that the available data types are those supported by SQL Server and field names must follow the conventions (for example, spaces are not supported in field names). But under the covers, the tables, stored procedures, views and database diagrams will be stored in the back-end DBMS. The result is that developing/upgrading to SQL server is almost transparent. In addition, for developers of client-server applications, Access 2000 includes
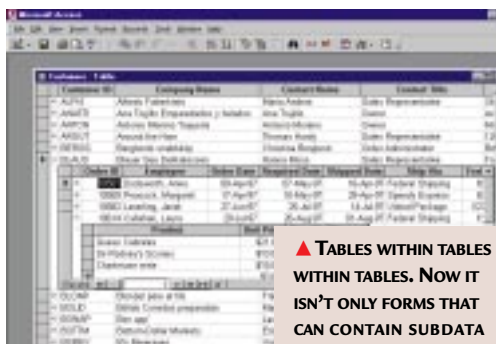
▲ TABLES WITHIN TABLES WITHIN TABLES. NOW IT ISN'T ONLY FORMS THAT CAN CONTAIN SUBDATA

Office 2000: The Developer's Perspective

There are now two distinct ways to program Office. Tim Anderson explains.
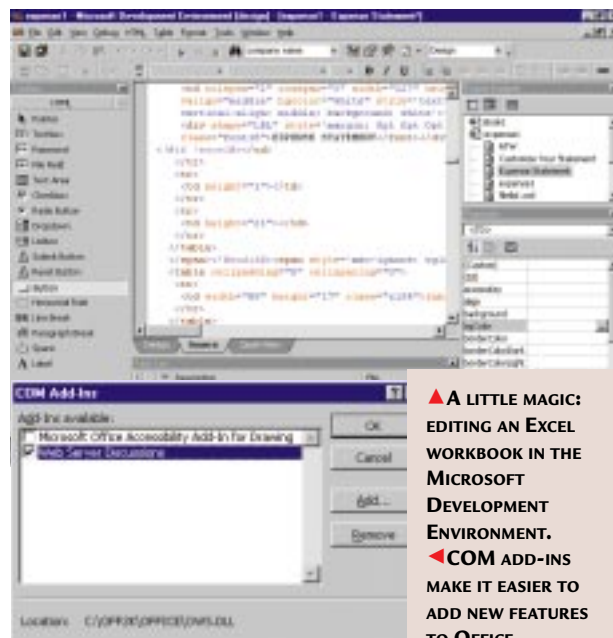
▲ A LITTLE MAGIC: EDITING AN EXCEL WORKBOOK IN THE MICROSOFT DEVELOPMENT ENVIRONMENT. ◄COM ADD-INS MAKE IT EASIER TO ADD NEW FEATURES TO OFFICE

THE VISUAL BASIC EDITOR IN OFFICE 2000 IS DISAPPOINTINGLY similar to the one in Office 97, until you try a little magic. The functionality is hidden from end-users, but Tools/ Customize in an application like Excel lets you add an Insert Script command. Select it, and instead of the Visual Basic environment, the new Microsoft Development Environment appears, as seen in Visual InterDev and Visual J++ 6.0. Your spreadsheet is there but in the form of XML and HTML code. The toolbox has standard and ActiveX HTML controls, and you can use scripts and dynamic HTML to enliven your Office web document.

Scripts can run on the client or the server. The snag is that the new scripts don't run in old Excel, so developers must take a decision. Is your new custom Office 2000 solution going to be primarily intranet-based, using the features of the Office Server Extensions along with standard web

techniques? Alternatively, old-style VBA development still works, and better than before thanks to VBA 6 which uses the same runtime as the full Visual Basic 6. In this case, the problem is reversed, since normal VBA macros do not run when Office documents are viewed as web pages. It is not going to be easy, the consolation being that if the document is edited using Office tools, both kinds of scripting will be preserved.

Looking at the web model, there are a host of development possibilities. Anything you can do with Active Server Pages or Dynamic HTML can be done in an Office document, too. Data Access Pages are a feature of Access 2000 that provide the easiest way yet to create fully scriptable web pages with dynamic data links. Data access is via ActiveX Data Objects, a COM-based technology which works well with remote data, unlike Data Access Objects used in previous versions.

Old-style VBA in Office

Office 97 was a breakthrough for developers, providing Visual Basic for Applications, complete with forms and class modules, into all the Office applications except Outlook. Outlook 2000 still lacks VBA, making do with cut-down VB Script.

Conversely, FrontPage 2000, part of the high-end version of Office, does

now get VBA. A key change concerns add-ins; code libraries that add new functionality to Office applications. In previous versions these have little consistency, being disguised Excel workbooks, Word templates, or special dynamic link libraries created with a C++ compiler. Outlook 97 was the worst, requiring developers to delve into the depths of the Exchange API to create an Exchange Client Extension. Office 2000 still supports these methods, but in addition there are COM add-ins, essentially COM servers which are hooked seamlessly into the host application. You will be able to create these with Visual Basic, using the same techniques for all the Office applications including Outlook. Another improvement is that code modules can be digitally signed to prevent the spread of macro viruses.

Using a little magic

Microsoft Office has an indirect effect on Windows developers, by introducing new standards which users then expect in other applications. Two examples in Office 2000 are HTML help and the Windows installer. The old Windows help compiler converted Rich Text Format documents into help files read by various versions of Winhelp, the familiar help viewer. New HTML help compiles HTML source code into .CHM (compiled HTML). Developers can now use the same skills in building online help when creating web pages, and users get better readability with the web. Office developers can also customise the install scripts to create versions that both limit and extend what gets installed, for smooth deployment of an Office solution.

Full developer features are likely to be only in the Office Developer Edition, which will also include a runtime version of Access 2000 for deployment.

Stephen Wickstead

Spies, lies &
the internet

AS THE GOVERNMENT PREPARES TO REGULATE E-COMMERCE, ENCRYPTION BECOMES THE SUBJECT OF THE MOST HEATED POLITICAL DEBATE OF THE CENTURY. JOHN LEYDEN EXAMINES THE PRINCIPLES BEHIND IT AND THE POTENTIAL THREAT TO CIVIL LIBERTIES.

ALONG WITH THE PROVINCE OF SPIES AND CYBERPUNKS, encryption is hitting the mainstream as government legislation, expected next year, sets up a next-generation model for e-commerce. As the Government sets a framework for online trade, small business users might at first well wonder why the software of espionage thrillers is dropping onto their desktop. The answer is a simple one: trust. Potentially, fraud is easier across the internet because it might be achieved without leaving any trace — and certainly no eyewitness. Without an environment of trust and privacy, customers are highly unlikely to provide confidential information.

Of course, it's possible for an internet user to buy a book from Amazon.com or even carry out online banking, today. However, these models of business depend on existing business relationships. To establish more complex contracts online (for instance setting up a small business or buying a house) requires legal recognition and a framework to build a public key infrastructure (PKI). For the user, a PKI means complex online transactions can be performed seamlessly, which isn't really possible today.

There are four requisites for trusted communication: authentication, non-repudiation, integrity and encryption.

☛ **Authentication** means you can be certain who you are doing business with.

☛ **Non-repudiation** means no-one can deny having sent or received transaction data, establishing confidence that a contract entered into will be honoured. It's also important to know that a transmission hasn't been altered — and that's where integrity comes into play.

☛ **Integrity,** which goes without saying, is trust in fair and reputable business practices.

☛ **Encryption** is the process of scrambling a message in order to hide its content, thus providing confidentiality. Strong encryption is needed to prevent hacking but also frustrates law enforcement agencies when they seek to unscramble messages.

The British Government and the Clinton administration are concerned that the increasing availability of strong encryption techniques has important implications for the fight against serious crime, drug trafficking and terrorism. US encryption regulations, enshrined in the Arms Export Control Act, classify strong encryption as "munitions", making it an offence for a US company to export it without a licence. The US has recently increased the strength of encryption allowed for export, from 40-key (relatively easy for a determined and skilled hacker to break) to 56-key, which is still breakable but would take longer. For e-commerce to gain the confidence of users, nothing less than 128-bit encryption will do.

The Government's Strategic Export Controls White Paper would make British restrictions on cryptography exportation even more restrictive than those in place in the US. The White Paper extends current regulations on exporting encrypted information, from printed and physical media, to encompass the spoken word and electronic media such as email.

BANNING THE EXPORT OF STRONG encryption is one of the routes government takes to control encryption. Some countries, like France and Israel, go further and ban the use of cryptography entirely. The other is establishing the ability to "steam open" its citizens' electronic mail. This is where the spectre of the state as Big Brother enters the door and a branch of applied mathematics becomes the subject of the most heated political debate of the late 20th century. To understand what all the fuss is about, it's first necessary to understand how encryption works.

With most commonly used forms of encryption, individuals would have two keys; one public and the other private. A message is signed with the author's own private key, resulting in a digital signature. This email message, attachment and the digital signature are encrypted with an algorithm using the recipient's public key. On receipt, this message can only be decrypted with the recipient's private key. By using the author's public key, the recipient can verify the sender's digital signature, proving the message is authentic and has not been tampered with.

In a public key infrastructure environment, digital certificates are used in combination with private and public keys to certify the identity of the sender of electronic communications such as email and web-based forms. The certificates are generated and managed by bodies called Certificate Authorities (CAs).

Encryption

Privacy advocates, human rights activists and software vendors **OPPOSE KEY-ESCROW AS A COSTLY MECHANISM** that threatens civil liberties

To implement a framework for electronic commerce, the Government propose legislation on encryption giving legal recognition to these digital signatures for the first time. It will also implement a voluntary licensing scheme for CAs or other providers of cryptographic services. Licensed organisations would have to deposit copies of scrambling keys with bodies called Trusted Third Parties (TTPs). Those so-called "escrowed" spare keys will be available under warrant for covert use by police and security agencies.

Privacy advocates, human rights activists and software vendors, oppose key-escrow as a costly mechanism that threatens civil liberties. Encryption guru Phil Zimmermann, the inventor of Pretty Good Privacy (PGP) said: "If you build an infrastructure where you hand keys to government, you tempt good government to do bad. We feared this kind of regulation so we made PGP resistant to key-escrow."

"Voluntary licensing does not necessarily mean you can go the way you want and do without licensing," warned Zimmermann who went on to say that the global nature of electronic commerce meant that other countries (some of which practice torture and persecution) would follow Britain's lead.

PGP is used by human rights organisations, including Amnesty International. In testimony to the US Senate, Zimmermann quoted from a letter he received in October 1993 from a Latvian, on the day that Boris Yeltsin was shelling his Parliament building. "Phil, I wish you to know: let it never be, but if dictatorship takes over in Russia your PGP is widespread from Baltic to Far East now and will help democratic people if necessary. Thanks."

IT'S NOT JUST PRIVACY ACTIVISTS AND software vendors overseas who are concerned about the Government's policy. The British Medical Association fear the Government's proposals for regulating the use of encryption will allow widespread tapping of personal medical information. The BMA is pushing to make sure medical data is exempt from the covert access to private electronic communications by law enforcement agencies. For its part, the Law Society is also warning its members to protect themselves against government spying by avoiding escrowed encryption. Despite arguments like these, the Government has not altered its plans substantially. Nigel Hickson, head of the DTI's Information Security Policy Group, said that the use of TTPs holding the keys for encryption is the best way to balance the conflicting needs of individual privacy and law enforcement, which

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ENCRYPTION PROGRAMS
Setting the code

Algorithms
The most common forms of public key encryption programs rely on the fact that it is mathematically difficult to factor the product of two extremely large prime numbers. Using schemes like RSA a pair of keys (public and private), which are mathematically related to these two large prime numbers, can be produced.
To derive one key from the other, except by blind chance, relies on solving an almost impossible problem. Even stronger encryption could come in the future, based on the maths of elliptic curves.

Programs
☞ PGP (Pretty Good Privacy) is the cipher of choice for net-citizens. It uses several scrambling mechanisms, long key-lengths and is freely available on the internet.
☞ SSL (Secure Socket Layer) involves the secure wrapping of messages typically credit card transactions across the internet. This can be switched on from a server without a digital certificate.
☞ S/MIME (Secure/Multimedia Internet Message Exchange) takes the data and scrambles it before wrapping it. It is integrated into email packages such as Microsoft Outlook

98 and Netscape Messenger almost as well as PGP is integrated into Eudora.
☞ SET (Secure Electronic Transaction) is a standard for electronic transactions developed by VISA. It's to be used in the next-generation of credit cards, that will use smart cards.
☞ DES is the US Government's Data Encryption Standard, a product cipher which operates on 64-bit blocks of data, using a 56-bit key. A product cipher applies several weak operations such as substitution, transposition and multiplication in order to scramble a message.

Cracking the code

Security experts divide hackers into three categories. **Rogues** — often children in their bedroom. **Exploiters** — a.k.a. "Black Hat Hackers" who act through personal profit, political motive or revenge. **White Hat Hackers** — who hack for research purposes.

Many hackers love nothing better than to crack "unbreakable" codes. Generally, the longer the key length the more possible keys there are and the harder it is to crack a code. That's why it's important to use strong encryption with long key lengths. The starkest example of hacking came when the original, exportable, 40-bit SSL encryption on the Netscape Navigator browser was broken. DES, since it is touted by the US Government, is also a particular favourite. Privacy advocates group the Electronic Frontiers Foundation (EFF) cracked the 56-bit DES in 56 hours with a $220,000 computer — down from the previous mark of 39 days. The EFF used a standard PC outfitted with custom chips. It's estimated this task would take an intelligence agency 12 seconds. Some experts, however, feel that the widespread use of encryption is the most important factor. Their argument is: why would a criminal break an encryption code to find a credit card number when inadequate security might allow them to lift thousands of numbers from a credit card database? John Botting, UK general manager of Security Dynamics which owns RSA, said: "All this talk of long bit lengths is just mathematical masturbation."

needs to be able to access information if there is evidence of law-breaking.

The Government have signaled that digital certificates will become the standard access to benefits and be required for online tax preparation, payments and access to governmental proceedings and documents. The Government has set an ambitious goal of transacting a quarter of business between citizens and government electronically by 2002. Already this process is beginning.

The Post Office has launched a £3m trial scheme to offer branded services in non-post office locations to help new business start-ups. The Open for Business scheme will be trialed for a year in Norwich, with electronic kiosks and computers in eight locations within post offices, council offices, libraries and business advice centres. Open for Business heralds the first widespread use of a database holding individuals' confidential encryption keys. Using a Post Office smartcard, small businesses will be able to register the start-up of a new company, or the employment of a new member of staff without needing to visit government offices.

"At the moment you have to fill in up to eight forms from three government departments to register. The failure rate is 40 percent," said David Clark, the then public services minister when he launched the scheme. Similarly, Barclays Bank is running a smart-card-based digital signature service that will allow an individual to register via the internet as self-employed.

People who are starting their own businesses are required to register with three government departments: the Contributions Agency, Inland Revenue and HM Customs and Excise. Using smart cards and readers in their home PCs or in select Barclays branches, the trial will enable users to submit streamlined electronic intelligence forms, digitally sign the forms, and submit them to the Government. However, unlike the Post Office scheme, the bank's cards will not store personal encryption keys used for sending and receiving encrypted messages. Sources say the bank is unhappy with government proposals to attach special requirements to licences granted to issuers of encryption keys. However, Nigel Hickson said that minimum standards for licensed CAs would be necessary to win public confidence in electronic commerce.

SOME MAY SAY THAT THE ENCRYPTION debate is central to the relationship between government and the individual. That's overhype, but only just. The widespread availability of strong ciphers means that shady characters have no need to use licensed encryption service providers. It's also possible to bury encrypted data text within, say, an image file via a process called steganography. The encryption genie is out of the bottle. Those who will use licensing regimes — and that means the man or woman in the street and the small business person — have the right to privacy as well as trust. The Labour Government could do a lot worse than reflect on its statements in opposition: "Attempts to control encryption are wrong in principle and un-workable in practice."

WWW.
GoodBusine
.co.uk

Illustration by Rod Hunt

Wired web world

THE INTERNET IS A USEFUL TOOL FOR BUSINESS, BUT you probably think that a dedicated connection is strictly for the big boys who can afford high-speed links and staff to keep everything running. Fortunately, that's not true at all. If several people in your office spend time accessing the web, or you send lots of email to clients, or you simply want a large web site on which you can run complicated scripts, you may well find that installing a permanent link to the net and building your own web server is the best solution for you. It's also easier and cheaper than you may think.

A permanent connection to the internet could cost you from £500 a month upwards. Think how much you're already paying for web space, email, and other facilities from your provider, remembering that half an hour's access at daytime rates costs about £1, and you may be surprised at how little more you'll need to pay for unlimited access, 24 hours a day. And, as you'll see, the technical side of getting connected is simpler than ever, too. With operating systems like Windows NT or Unix, linking up to the net, whether it's for email, desktop surfing or publishing web pages, is well within the reach of many people.

What's involved?

Connecting to the internet isn't as hard as you might think. In fact, you may already have most of the software and hardware that you need. The largest investment is in a server, which can be used to handle email, deliver web pages or cache them for people in your company, giving them faster browsing. The type of computer you need to a large extent depends on the software you need and its requirements. Don't be too carried away with speed: remember that the cheapest permanent net connection only delivers around 8Kb per second; with that sort of bottleneck, a 400MHz Pentium II will be twiddling its thumbs most of the day. For a web server, you'll find disk performance and sheer reliability much more important than processor speed. You'll also need a router which connects your network to the rest of the internet, and the leased line itself. That's simply a dedicated telephone circuit to your internet provider, which usually terminates in a small box, with a socket for your router to connect to. A router will cost you between about £750 and £2,000. And for a small office, with a 64K link to the internet, expect to pay around £1,000 for a router.

On the software front, you may find that you don't need to add much more; and unless you
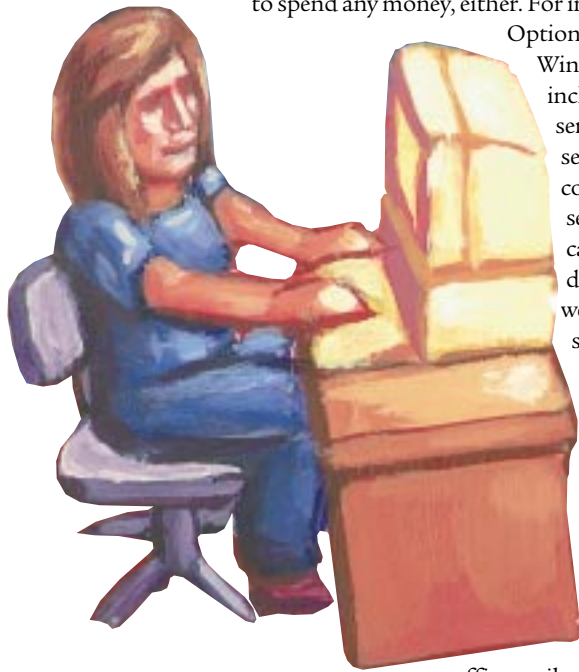
have specialised requirements, you may not need to spend any money, either. For instance, the Option Pack for Windows NT includes a web server. Unix-based servers often come with a web server, and you can also download a wealth of free software from the net itself. Email is one area where you may need to spend cash, depending on the type of internal mail you're already using; some office mail systems will require a gateway to connect you to the internet, which could cost a few hundred pounds. Others may already include the facilities you need.

Making the right choices

When putting your office online, you'll need to decide on a number of things. What speed connection do you need? What about a router? Should you go for a Windows NT system, or use Unix? The most important thing to consider is the capacity of your line. Providers will come up with lots of figures to help you decide what speed link you need; the basic entry level is 64Kbits per second — the same speed as a single ISDN channel.

The next step up is 128K, but it's a hefty step: unless the actual link can be provided by a cable company, get set for a shock. A British Telecom line will cost around £1,000 to connect for a 64K line, but £6,000 for 128K, because they install a fibre optic link. Other companies, like Cable London, charge the same to install a 128K link as a smaller one, so it may pay to shop around.

What will a 64k link handle? In theory, if it were running flat out all month, it could deliver around 20Gb of data. In practice, things are a little different; my own web server, with about 1.5 million requests, delivers 10Gb a month down a 64K line; but at peak times, some people are having to wait. If you expect lots of hits on your web site at the same time, you're going to need a bigger line or people will have to wait longer to see pages appear. You might be put off by the high costs of installing a 128K line or faster, but it's not the only option; some routers can use an ISDN line to increase the capacity at peak periods. The ISDN can also be used as backup should the main link fail.

Choosing a router is fairly straightforward; it's largely a question of making sure you use one compatible with your ISP — though consider some features like whether or not it supports people dialling in via ISDN or modems, and if it can handle security for you, allowing access only to "public" machines on your network. Finally, there's choice of Unix or Windows NT for the server. For many, the decision is simple — stick with what you know. But there are other considerations. A Unix-based server isn't as straightforward to configure as the NT alternative, but you'll find most of the software you need on the net — and the server itself may

When to make the move

There's no hard and fast rule for when you should take the plunge and move away from the dialup connections and web sites hosted with providers that most people rely on. After all, you're unlikely to be able to afford a web server with a link as fast as your provider unless you spend serious money. But there are a number of scenarios where it can make sense to link up.

☞ **A small office** with a 25Mb web site and around 20,000 hits per month, has a mailing list of 1,000 customers who want to be kept up to date with new products. There's also an auto-responder email address for people who have simple enquiries, and a domain name with dialup email to the office network. A typical cost from an internet provider for

this type of service is around £250 per month — about half the cost of a leased line connection. Add the cost of surfing the web during the day, at £2 per hour, and if people in the office spend much time online, a permanent connection could be a real winner, allowing more customer mailing lists and unlimited web space. However, remember that if there

are large files on the web site or it becomes very busy, a 64K line won't be sufficient.

☞ **A design consultancy** wants to put its old work, including multi-megabyte files, on the web for people to see, and to have access to email for sending work to clients. Depending on the cost of web space, an office server may be cost effective — but remember that

large files aren't going to arrive quickly, especially if the site is busy. To create a good impression when people want to download your work, they are probably best kept on an ISP's server, which will be faster. Nevertheless, if a lot of email is sent during the day, with large files, a leased line could be worth it, if the current dialup bills are approaching the cost.

Some important questions to ask

ABOUT THE SERVICE PROVIDER

☛ **If you're paying** for a certain bandwidth, is that guaranteed? Are there options, like frame relay, where you just pay for what's used?

☛ **Can the ISP** host mail boxes, or provide a Domain Name Service for you?

☛ **How many IP** addresses will they allocate? Is that sufficient?

☛ **Is an ISDN** backup option available? If so, can you use your existing ISDN line, or will the ISP insist on installing a new one?

☛ **Can the provider** offer aggregation, where a low-capacity line can be augmented with ISDN during busy periods?

☛ **Will the ISP** supply and configure a router for you?

☛ **Is assistance** with other configurations, such as name servers, offered?

☛ **What backbone** capacity does the provider offer? Are there links direct to Europe as well as the the US?

☛ **Who do** they peer with? If they don't have agreements with other major providers, you may find UK traffic to your server crossing the Atlantic twice.

ABOUT A ROUTER

☛ **Can the router** be used with ISDN as well as with a leased line? Will it handle ISDN backup and aggregation?

☛ **If you decide** to upgrade your line later, will the router handle the capacity, or will you have to buy a new one?

☛ **Can the router** block traffic to or from certain sites, for filtering or security?

☛ **Will it handle** incoming connections via ISDN or modem for people working outside the office?

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not need to be as highly specified. The server that I use to deliver 10Gb of web data, and up to 10,000 mail messages a day, isn't a massive powerhouse. It's a Pentium 90 with 64Mb of memory, running SCO Unix, and home to nine virtual web servers. You'll need a higher-specified server to achieve the same performance under Windows, though you'll also have a much simpler system to look after.

The role of the ISP

Compared to the cost of a dialup connection, even using ISDN, a leased line to the internet is expensive. And it's not just the cost of the link itself that bumps it up. So what are you paying your ISP for? Connectivity is the main thing, but if you're not confident about some of the technical aspects of running your network, such as configuring name servers, most ISPs will include that in their charges. Some will also provide you with a fully "managed" service where they look after the router, so all you have to do is

plug it in, switch on and hook up your web and email servers. Those too, of course, can be looked after by your provider, or you could let them handle email, while complicated web scripts accessing your order database run on a server in the corner of your office.

Setting it all up

The box on page 254 shows in detail how to configure the Microsoft Web server to publish your own pages on the internet, but before you can even get that far, there are other things you'll need to consider. Planning is

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Leased Line Providers

The number of internet providers offering leased lines has increased dramatically over the last few years. Many of the companies that are members of LINX (the London Internet Exchange) offer leased lines. A complete list is at www.linx.net, where you can also check to see which providers exchange traffic with

each other. Prices vary, and many providers charge according to distance; expect to pay less in a large town like London than in a rural location. A basic 64K leased line will cost about £1,000 to install, and £600 per month. Some of the best-known providers are listed on page 256 ["PCW Contacts"]. Hard and fast costs

aren't always easy to come up with, but especially for smaller-capacity leased lines, many providers work on a flat rate – though others still base the line charge on the distance in kilometres between the telephone exchanges involved. For higher-capacity links, you're more likely to have to pay per kilometre.

We asked two providers to come up with quotations for two services (*below*). The first, a 64K line to a village near

Winchester, and the second for a 2Mb link to an office in central London. Prices exclude VAT, and rental figures are per annum.

SUPPLIER	DEMON	UUNET
64K installation	£1,000	£1,000
64K rental	£7,200	£9,500
ISDN backup installation	n/a	£750
ISDN backup rental	n/a	£2,000
2Mb installation	£5,200	£4,200
2Mb rental	£32,490	£15,000
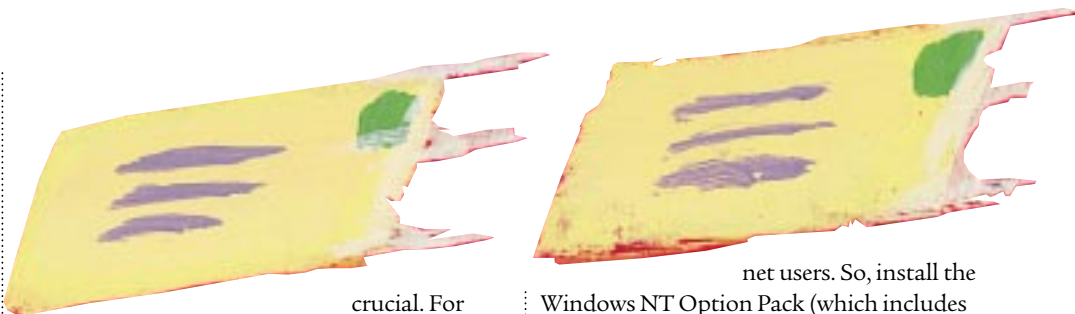
crucial. For example, do you want every computer in your office to have direct access to the internet? Can you even be allocated enough addresses for them all? Some providers will only allocate you a limited number of IP addresses, so you may need to hide some computers behind a firewall — which makes for more complicated configuration, though it does make systems safer from hackers.

You'll also need to check other security issues, like installing all the latest patches and updates for bugs in systems like Windows 95 and Windows NT: miss out on some updates, and your systems can easily be crashed by malicious

net users. So, install the Windows NT Option Pack (which includes Service Pack 3, as well as the web server) and the service packs for Windows 95. If you've opted for a Unix system, check with the vendor for information about common problems including the "ping of death", "out of band data" and web server security holes — all ways of crashing or gaining unauthorised access to systems on the internet. Check other issues, like systems with file sharing enabled via TCP/IP and no passwords — easy to do with Windows 95, and potentially disastrous. Decide too how you want to handle email, web sites and an intranet. Will some services be best handled by the ISP? For a small office, for example, having your email stored on the ISP's POP mail server will save you having to

Configuring a web server using Windows NT

At its simplest, setting up a web server in your office can be very straightforward. Arrange the line, have your service provider configure a router for you to plug into it, and ask them to give you a list of the internet addresses you've been allocated. Decide which

addresses are for the web server, mail server and other essential systems, and configure them all. Plug in the router, connect it to your network, and switch on. Your PCs should be able to browse the web; setting up the web server requires a little more work. Here, we've

used Internet Information Server for Windows NT 4; you can download it from the Microsoft web site as part of the NT 4 option pack. You may want to wait until you have your link to the net functioning — the pack is around 27Mb to download.

◀**During installation** you'll be asked to enter some basic information, including choosing a directory for your web pages. You can change everything later. This screen shows the Internet Service Manager, which is the simplest way to configure your system. You'll find it in the NT Option Pack group on your Start menu. It's the easiest way to stop and start services like the web and ftp servers.

▶**Right click on the Default Web Site** and choose 'Properties'. You'll see a screen like this. You can

choose to limit the number of connections to your web server, and the type of log file you want. By clicking on the Advanced button, you can make the server respond only to certain IP addresses — use that feature if you want more than one web server on the same computer. For example, you might have intranet.yourfirm.co.uk and www.yourfirm.co.uk set up. By allocating each a distinct IP address, you can have them both on the same PC.

▶**The Documents tab is used** to control what happens when someone misses the name off the end of a URL. Here we've added index.html to the list of defaults, which means that if someone requests www.yourfirm.co.uk,

they'll see the file www.yourfirm.co. uk/index.html, or www.yourfirm.co.uk/ Default.htm.

▶**The Custom Errors tab allows** you to set up the error messages returned by the server. By altering this option you could, for example, direct people to a site map page, or a search system if they request a file that doesn't exist.

When you've finished making changes, the Internet Service Manager will save them all, and you're ready to publish your web site.

install software yourself, but you may lose the ability to run mailing lists, or to add useful aliases for services like "sales" and "accounts". You'll also need to register a domain name, and allocate names to all the systems that can be accessed from the rest of the internet. And decide if you really want to configure each PC automatically,

or to have a server do it for you using DHCP — the Dynamic Host Configuration Protocol — which will save visiting every system when you want to make changes, but also means every PC may have a different address each time it's turned on.

Don't forget to consider the more mundane things, like power supply, too. If you want to make sure your site is always available, invest in a UPS, and make sure it's powerful enough to run the server, router and the Network Termination Unit that sits on the end of the leased line. All this might sound like a lot of work, and it can be, but if you plan carefully you should be able to

configure all the systems in a small office, including a web server, ftp site and email server, in just a couple of days.

Conclusion

It might seem that there's a lot to think about; but connecting your LAN to the internet isn't as technical or complicated as it seems — and a good service provider will help you with most of the really tricky aspects of the system. Nevertheless, if you really want to achieve the potential that's opened up by having a web server sitting in a corner of the room, and a direct link from every desktop to the internet, then you'll need to invest time in planning and choosing the right equipment. There are dozens of internet providers who will be able to supply you with a link, with differing options, prices and levels of service. The cheapest may not be the best — especially if it means you have to spend time dealing with technical details that would be best left to someone else. So, think what you want, shop around, and find out the best solution for your needs. Whether you want a plug-and-play solution, or complete control over everything that happens, there's one sure thing about building your own web server and connecting your office to the internet — you'll wonder why you didn't do it sooner.

A month in the life of a server

Just how much can you do with an entry-level 64K line? Here are the figures for my own server's web traffic, in addition to which, it delivers up to 10,000 email messages each day, from a number of mailing lists.
☞ **The server** is a Compaq Prosignia 300, 90MHz Pentium with 96Mb of memory; memory and disk are more important than raw speed, with the bottleneck of my 64K line. The server runs

SCO Internet FastStart and hosts nine different web sites.
☞ **The router** I use is a ShivaIntegrator 150 which offers ISDN backup, aggregation, and supports leased lines up to 256K. (*The following figures are for July 1998*)
● Total number of http requests received: 1.69 million
● Total number of bytes transferred: 9.96Gb
☞ **The maximum** capacity of a 64K line is

approximately 20Gb per month, suggesting that only 50% of the link is used. In fact, the peak hourly figure reaches 71.1%, or 19.5Mb — and that's not the end of the story. During heavy peaks, the router uses an ISDN line when the leased line reaches 95% capacity, giving 128K of bandwidth. At present, the average time using ISDN is about one hour a day, suggesting that for practical purposes, the limit of a 64K link is

fast being approached. If you want this sort of flexibility, though, you'll have to hunt for providers who offer it, or choose a service that bills you by the amount of data transferred over a higher capacity link.
☞ **When you look** at the logs from your own web server, it's important to analyse them by time of day and look at the peaks — otherwise you could fall into the trap of thinking you have plenty of spare

capacity, when you're actually close to the limit. But for many people, a 64K line could turn out to be a very cost-effective way to get on the net. You really don't need to spend a fortune on hardware and software.

Compaq
0845 270 4222
www.compaq.co.uk
SCO 01923 816344
www.sco.com
Shiva 0131 561 4200
www.shiva.com

The big top ten

As far as this PCs group test was concerned, expense was no object. Letting the bank balance bear the full brunt of our extravagance, we treated ourselves by specifying the best hardware available to take an in-depth look at some of the first 450MHz Pentium II-based machines from ten of the biggest names in PCs.

What could better complement one of these fast processors than a generous bundle of memory? With RAM prices falling all the time, we opted for 128Mb; enough to run even the most demanding applications we could throw at it. Installing Windows NT 4.0 as our operating system, we were looking fairly and squarely at the business market and so asked our suppliers to include large hard drives of at least 4.5Gb. In many cases they came up trumps with SCSI-based systems, so be sure to keep an eye on our BAPCo test scores to see if paying the little extra that this super-fast interface will set you back really does pay off in terms of performance. And just in case you are worried about data loss, we asked for some kind of removable drive to be added for backup, with a capacity of 1Gb or over.

PCs of this spec could easily be used for graphical applications, and so a 19in monitor seemed particularly suitable as in many instances, coupled with an 8Mb graphics card, it would allow us to run resolutions as high as 1600x1200. The pay-off, in the form of a slight reduction in the amount of free disk space left at our disposal, seemed a small price to pay.

The PCs we received were subjected to our usual rigorous PCW Labs testing procedure, scaling their performance against a suite of commonly-used business applications, each designed to tax the power of every component.

Contents

PCs tested and reviewed by Nik Rawlinson and Paul Trueman.

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Armari MBX-450 Workstation

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

The dual-processor ASUS motherboard in the Armari offers a useful upgrade path for power users. Its 9.1Gb Seagate Cheetah SCSI hard drive was backed up by a single 128Mb SDRAM DIMM. A further three free memory slots would allow us to increase our installed memory to 512Mb without replacing what was already installed.

The Adaptec SCSI controller chips are onboard, leaving one free ISA and a massive four free PCI slots at our disposal.
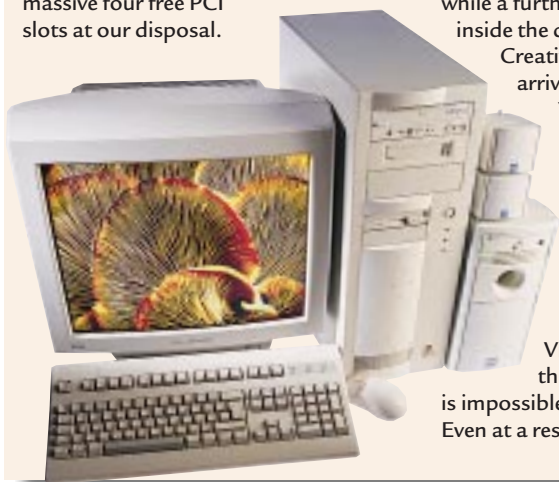
Unfortunately, one of the PCI slots was obscured by a badly-strung SCSI cable, and we were also disappointed that accessing the free memory slots was difficult, due to the hard-drive cabling obscuring them.

Mass backup storage was catered for by both a Travan tape drive offering space for up to 8Gb of compressed data, and a CD writer. One each of 5.25in and 3.5in drive bays remained free externally, while a further 3.5in bay was left vacant inside the case. Sound was driven by a Creative Labs AWE 64 card and arrived courtesy of a set of Yamaha YST-MS25 speakers comprising a large sub-woofer and two smaller tweeters for a total output of 25W.

We were not surprised that one of the best images in this group test was that produced by the Iiyama Vision Master 450. Although this monitor may look dated, it is impossible to fault its performance. Even at a resolution of 160 x1200 there

was no discernible flicker, and even small characters on the screen remained easily readable. Screen regulation was perfect while, when running our tests, all guns lined up to present synchronised red, green and blue test patterns and the ten primary colours test demonstrated uniform fading scales.

PCW DETAILS

Price *£3,406.33 (£2,899 ex VAT)*
Contact *Armari 0181 810 7441*
www.armari.com
Good Points *Dual-processor motherboard. Potential for 512Mb RAM. CD-ROM writer. Monitor.*
Bad Points *Difficult to access memory slots. Badly-positioned SCSI cable.*
Conclusion *One of the best.*

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★
Overall Rating	★★★★

Atlantic Proteus 450LVD

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

The majority of PCs we see for review have approximately the same configuration. But there are always a few that stand out. The PC we received from Atlantic was one such machine: it was packed to the rafters with toys to delight the tech-head. A CD-RW drive from Traxdata, should you wish to write information to CD, and a DVD drive from Creative Labs. And, whereas other manufacturers had gone for the prehistoric 1.44Mb floppy, Atlantic had included a Mitsubishi LS120 drive which also reads and writes conventional 1.44Mb floppies.
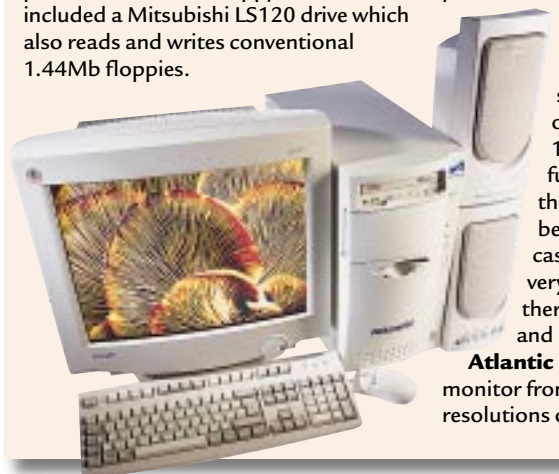
The LS120 and DVD drives both used IDE connections, with the CD-RW using an Ultra Wide SCSI connection and the 9Gb Seagate hard drive using the latest LVD SCSI 2 interface. Both were hooked up to an Adaptec SCSI controller, taking up one of the four PCI slots.

Both ISA slots were filled: one with Creative Labs' AWE 64, the other with a Cheyenne K56Flex modem using the Rockwell chip. Atlantic also scored points for its choice of graphics card — the Millenium G200 from Matrox. This 2D/3D card comes with 8Mb as standard but there is space on the card to upgrade to 16Mb, ensuring that it is future-proof. However, we thought the machine would benefit from a larger tower case, as the components are all very closely fitted, although there are still spare single 3.5in and 5.25in bays.

Atlantic bundled a 19in DJ800 monitor from Mag, capable of resolutions of up to 1600x1200. The

DJ800 could support that resolution at a decent refresh rate of 70Hz, although some sensitive eyes will still be able to detect flicker. The DJ800 uses the excellent, user-friendly, dial OSD, perfect for being able to make quick changes to the display.

PCW DETAILS

Price *£2,936.33 (£2,499 ex VAT)*
Contact *Atlantic Systems 0990 134725*
www.atlanticsystems.com/sys/
Good Points *Packed full of high-end gadgets…*
Bad Points *…"packed" is the operative word.*
Conclusion *A smashing piece of kit.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★

Compaq Deskpro EP Series 6450

Compaq was unable to supply a SCSI hard drive and opted instead for a 9.5Gb Maxtor IDE device. Only 20 percent of the drive had been partitioned, wasting space and leaving it up to users to struggle with partitioning themselves. The interior was fairly messy, with cabling obscuring the two free memory slots, and the 128Mb RAM had been installed into the Compaq motherboard on a single module.

We were disappointed with the quality of the Titan PV3 sound card, but the internal speaker which it drove was of high quality and did away with the need for external units. The excellent keyboard and mouse were comfortable in use for extended periods throughout our tests.

The case had enough rubber feet to be used as either a mini-tower or a desktop unit, but with only one free external 5.25in and one internal 3.5in bay we were disappointed that this machine suffered from the usual "desktop" problem of limited expansion opportunities. Removing the drives was facilitated through the inclusion of a quick-release mechanism. Three free PCI slots complemented the free shared slot, but all dedicated ISA slots were filled. The PC itself was built around an Intel 443BX chipset.

The monitor, a Compaq V90, provided an excellent image. Screen uniformity and fine image detail could not be faulted, although in line with many other monitors, slight moiré was evident on a fine-line test pattern. However, it did have a problem with displaying a greyscale image of 256 intensity levels. The image should have stretched right across the screen but was instead bordered by two vertical bars, about an inch wide, on each edge. It received its signal from an AGP Matrox Millenium G200 with 8Mb SGRAM onboard — a card that is ubiquitous in machines of this specification.

PCW DETAILS

Price *£2,328.75 (£2,050 ex VAT)*
Contact *Compaq 0845 270 4000*
www.compaq.co.uk
Good Points *Good internal speaker. Rotatable case.*
Bad Points *Hard-drive partitioning. Messy interior.*
Conclusion *Worth consideration, but as there are limited expansion opportunities you may outgrow it*

Build Quality	★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

Dan Dantum II/WSU

With a full tower case this PC was a behemoth of a machine, offering an impressive three free external 5.25in bays, one free external 3.5in bay and two free internal 3.5in bays, making this case suitable to house a network server.

The installed Seagate Cheetah SCSI hard drive stretched to 9.1Gb of storage and was backed up by a Travan drive for data security. The SuperMicro dual-processor motherboard, as well as offering ample opportunity for increasing the processing power, incorporated onboard SCSI to keep three of the PCI slots free.

The Dan's file-server potential was confirmed through the inclusion of four memory slots on the motherboard, of which three remained vacant. There was 128Mb pre-installed, allowing us to increase the total installation to 512Mb without making any replacements. Both a 56K modem and a 3Com Fast Etherlink XL 10/100Mb TX network card ensured that whatever the situation, this PC was ready and waiting to be hooked up to the outside world. Sound was catered for by an AWE 64.

The Dan-branded CTX monitor performed well, with a maximum non-interlaced refresh rate of 75Hz at 1280x1024. With good screen uniformity across the image surface it showed no evidence of defocusing, blooming or halos when bright white images on a black background were compared with greyer equivalents (this is evidence of a sharp picture). But, like the Compaq's, this monitor had trouble filling the whole width of the screen with a 256-level greyscale fade, and instead filled the vertical inch or so of gap to the left and right of the picture with black bars. The display was driven by a Matrox Millenium G200 with 8Mb onboard.

PCW DETAILS

Price *£2,986.85 (£2,542 ex VAT)*
Contact *Dan 0181 830 1100*
www.dan.co.uk
Good Points *Loads of expansion room. Server potential.*
Bad Points *Problem with 256 greyscale intensity monitor test*
Conclusion *Good machine, but a full tower case may be a little large for some.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Dell Workstation 410

Despite the considerable amount of hardware inside this PC, Dell had not opted for a giant case as had some manufacturers. Consequently, there was not the same accessibility that we saw in towers like the Evesham. On the flip side, you won't have a desk Goliath that blocks out the sun.

Whereas in larger cases we saw the bulky power unit positioned above and away from the motherboard, allowing total access, the Dell configuration placed the power unit over the top part of the motherboard, the DIMM slots and onboard SCSI connections for the CD-ROM and 12Gb Sony tape drives. Rather than having to unscrew the power unit to get access to the motherboard, as with less well-designed PCs, Dell has designed its power unit so that it flips out on a hinge and stays there, suspended high enough over the motherboard so that we could get a good look at the insides of the machine.
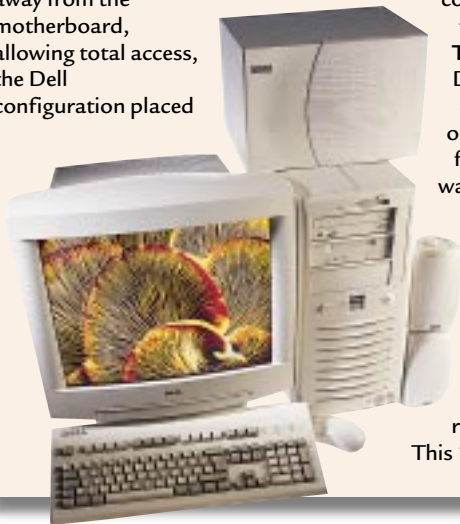
The AGP slot was taken up with Diamond's 2D/3D 8Mb Permedia2 card. Because the SCSI was onboard, it left all five PCI slots free for further possible expansion. There was a single consolatory ISA slot, too. Network access is provided via the 3Com network interface card, and the 8.5Gb Quantum SCSI hard drive was backed up by a Sony SDT9000 tape drive which takes 12Gb tapes.

The monitor was one of Dell's own, the D1226H, capable of resolutions up to 1600x1200 pixels. This 19in monitor provided excellent focus across the 17.9in of viewable area and could easily support a resolution of 85Hz at a resolution of 1024x768, with little discernible loss of sharpness.

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

PCW DETAILS

Price *£3,983 (£3,390 ex VAT)*
Contact *Dell 0870 907 3335*
www.euro.dell.com
Good Points *Lots of data storage available, as well as hardware expansion space.*
Bad Points *If it had been a little quicker, it would have been even more impressive.*
Conclusion *Worth consideration, but as with the Compaq, it has limited expansion opportunities.*

Build Quality	★★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★★

Evesham Micros Platinum SE

The case that Evesham had chosen for its PC caused gasps in our labs when taken out of the box; it was the size of a small (rectangular) child. Admittedly, Evesham has kitted out the PC most impressively, but unfortunately such largesse has also extended to the tower case. This monster was cavernous: even with a floppy drive, DVD-ROM, Iomega 2Gb Jaz drive and removable 8.5Gb hard drive taking up lodgings, there was still an impressively generous amount of room left over. But our gripes about the size apart, Evesham has put together an impressive bundle.

In terms of hardware generosity, it beats most of the other PCs we saw in this group test. There is a quite frightening number of drive bays on this PC: six for 5.25in drives (two free) and three 3.5in bays (all free). Quite obviously, expansion is not going to be a problem in this machine.

The slots were filled with some impressive kit. There was the Millenium G200 graphics card from Matrox, a 56K modem using the Rockwell chip, and Creative Labs' AWE 64 sound card, leaving no ISA slots but four PCI slots free. Bearing in mind the relatively free rein we had given the companies in this group test, it was surprising that more had not chosen to fit DVD drives, and it was good to see both a DVD drive as well as kit like the 2Gb Jaz drive, with its Narrow SCSI interface.

Evesham scored extra points for bundling the excellent Ergovision 975 19in monitor from Taxan. With an impressive viewable area of 18in, the Ergovision was capable of a refresh rate of 60Hz at 1600x1200.

PCW DETAILS

Price *£3,053.83 (£2,599 ex VAT)*
Contact *Evesham Micros 01386 769600*
www.evesham.com
Good Points *Ideal for a user who needs to expand their machine.*
Bad Points *Too big to sit on a desk and perhaps too big to fit underneath.*
Conclusion *A gargantuan PC, full of impressive kit.*

Build Quality	★★★★
Performance	★★
Value for Money	★★★★
Overall Rating	★★★

Hewlett-Packard Kayak XA-S PC

At the other end of the spatial spectrum to the huge Evesham box is the dinky Kayak XA Workstation from HP, a company which prides itself on the scalability of its workstations, made to make life bearable for IT managers. The exact benefits of this model are questionable, with the labyrinthine layout of the components. The box is as long as the motherboard and slightly wider, while the drive bays are suspended inches above the motherboard. With one free 5.25in bay and two free 3.5in bays, there is some room for expansion, but
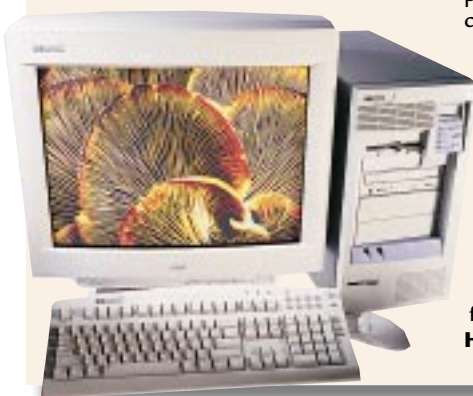
getting to the motherboard to connect any new drives looks tricky. A large metal skeleton hangs over the motherboard, holding the drives, and this is definitely not the machine for the user who likes to tweak and fiddle.

In the end we were able to get to the DIMM slots, but the process is not so swift and painless as HP would have you imagine. Power and IDE connections have to be pulled out, as well as various plastic covers inside the PC. Although the design to remove the cover of the PC is beautifully simple, it is not a simple process, attempting to unplug power connections and then having to put it all back together again.

Although there are high-end Kayaks available, we seemed to have received rather a neutered version. Instead of the SCSI connections, tape storage, DVDs and CD-RW we saw in other machines in this group test, the Kayak had just a conventional IDE CD-ROM and floppy drive. HP had also fitted the 2D Productiva G100 card from Matrox, and an Ethernet card.

HP surprised us with its huge 1100

21in monitor (big enough for any user). This is an excellent monitor, with vibrant colours and refresh rates that remained healthy even at a maximum resolution of 1600x1200. The OSD was excellent, with sensitive, user-friendly controls. However, this mammoth monitor has a price to match its size.

PCW DETAILS

Price £4,177.13 (£3,555 ex VAT)
Contact Hewlett-Packard 0990 474747
www.hp.com/go/kayak
Good Points *Some nice design touches, plus the HP brand.*
Bad Points *Skimpy hardware. Fiddly when trying to look inside.*
Conclusion *Offers few reasons for buying one, compared to the competition.*

Build Quality	★★★
Performance	★★★
Value for Money	★★
Overall Rating	★★

Hi-Grade Axion PV2 450

Our first impression on opening up the Hi-Grade case can be summed up in one word — wires. Loads of the blighters. We were initially confused by the jumble of leads and surprised that the Hi-Grade engineers hadn't made more of an attempt to bunch them up. The individual wires from the IBM SCSI hard drive were draped over the Matrox graphics card and the ribbon cable that daisy-chained the CD-ROM to the Hewlett-Packard SureStore T4 tape drive. It's not that
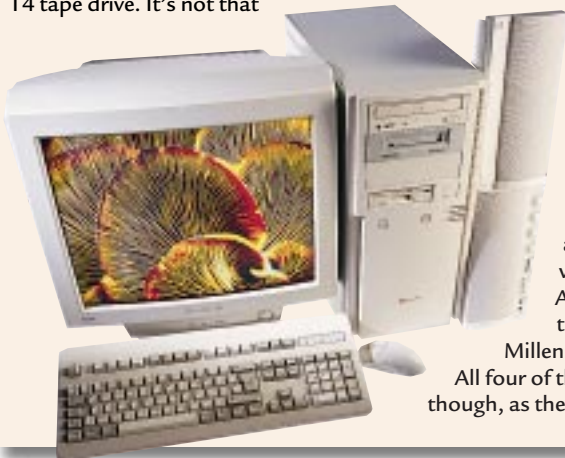
we appreciate neatness *per se*; more that the wires obscure the motherboard and hardware. This will make your life harder should you wish to upgrade your RAM, or any other component.

There wasn't that much room for expansion in this PC compared to some others we saw. There was only one spare 5.25in bay and one spare 3.5in bay, with the hard drive filling the other 3.5in bay, suspended out a few inches from the other drives over the motherboard. If you wanted to access your RAM, you would need to detach the 3.5in bays first, to get at them. Two of the four PCI slots were taken up, one with a 3Com 10/1000 Fast Etherlink Network card. More unusually, there was a PCI sound card — the 64-voice Aureal Vortex. The AGP slot was taken up with the excellent 2D/3D Millenium G200 from Matrox. All four of the PCI slots could be used, though, as there was sufficient space

between them, and the two (empty) ISA slots mean that they don't share a backplate.

Hi-Grade had included the Iiyama VisionMaster 450 with its PC. This is an excellent 19in monitor with sharp focus and vibrant colours. Should you wish, it is capable of displaying 1600x1200 at a healthy 75Hz. The VisionMaster has one of the best OSDs we have seen.

PCW DETAILS

Price £2,579.13 (£2,195 ex VAT)
Contact Hi-Grade 0181 532 6100
www.higrade.com
Good Points *Excellent graphics and audio cards.*
Bad Points *Little room for expansion.*
Conclusion *If you never want to open it to tweak, you won't mind the Hi-Grade.*

Build Quality	★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

Mesh Elite 450DS19

Mesh was one of the few companies which managed to fulfil our wish for a dual-processor-capable motherboard, giving ample opportunity for users seeking the ultimate power machine to improve upon the single 450MHz Pentium II at a later date. Three free memory slots supplemented the 128Mb RAM, making 512Mb RAM a possibility even if we chose not to remove what had already been installed.

Adaptec SCSI chips resided on the motherboard, keeping one ISA and three PCI slots free. Two external drive bays, one 3.5in and another 5.25in, were also vacant, offering the opportunity for modest expansion in this area. An enormous IBM SCSI hard drive of 18Gb was partitioned into a 4Gb system drive and a 14Gb storage area. External connectivity, meanwhile, was catered for by an Intel Ether Express Pro 10/100 card but networking protocols had not been installed. A 4Gb HP SuperStore Travan drive would ensure we could back up our vital data. Sound arrived with the aid of a budget SoundBlaster (the Vibra 16) and a set of Yamaha YST-M20 speakers. The mouse and keyboard were both of high quality and comfortable to use throughout our tests.

The monitor achieved an almost flicker-free refresh rate of 70Hz at a stunning 1920x1200 resolution, which would certainly make this setting suitable for short-term use, if not for everyday applications. Driven by a Diamond Fire GL1000 Pro graphics card, it had 8Mb of memory to call on to produce a well-regulated image with a uniform intensity across the whole of its surface. The only slight complaint we had was that magenta tones faded slightly faster than the other nine primary monitor test colours, but this is not something that would be discernible in everyday use.

PCW DETAILS

Price *£2,970.40 (£2,528 ex VAT)*
Contact *Mesh 0181 452 1111*
www.meshplc.co.uk
Good Points *Dual-processor motherboard. Potential for 512Mb memory.*
Bad Points *Only modest drive-increase potential.*
Conclusion *A nice machine, but nothing special.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Viglen BizPro 450KS

The potential for expansion in this machine was adequate, with two free PCI and two free ISA slots complementing one internal and one external free 3.5in bay. Unfortunately, though, it would be very difficult to use any of the free PCI slots as components on the AGP graphics card, and a PCI SCSI interface card intruded into their spaces. The 64-bit 128Mb SDRAM had been supplied as a single module, leaving a further two slots vacant and enabling us to expand our allocation to a maximum of 384Mb without replacing what was already installed.

The hard drive was a speedy Seagate Cheetah Ultra 2 SCSI device with a 9.1Gb capacity and an average seek time of just 5.2ms, while backup storage was catered for by a SCSI Travan tape drive, giving a maximum of 8Gb compressed storage.

This was a pleasant PC to use, with a comfortable, responsive keyboard and an attractive, contoured case that was surprisingly compact considering the expansion opportunities it offered. Rather than being supplied onboard, as is sometimes the case, sound was provided by an Aureal Vortex Audio card and arrived through a Yamaha speaker set with a large sub-woofer and satellite tweeters.

The Viglen-branded CTX 19in monitor with an 18in viewable diagonal was excellent, with an 85Hz refresh rate at 1280x1024 resolution. The extensive OSD allowed for fine-tuning and colour-temperature adjustments. Although colour registration was perfect and there was no streaking or ghosting, it did demonstrate slight moiré on all test patterns. Driven by an AGP Matrox Millenium G200 card with 8Mb of SGRAM, we could, if we chose, increase this to a maximum of 16Mb.

PCW DETAILS

Price *£2,172 (£1,849 ex VAT)*
Contact *Viglen 0181 758 7000*
www.viglen.co.uk
Good Points *Expansion potential.*
Bad Points *Cluttering of expansion slots. Moiré on monitor test patterns.*
Conclusion *Good, all-round machine.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

A preview of Intel Katmai

The replacement for the Pentium offers vastly improved 3D performance; but will it be enough?

Katmai, the replacement for the Pentium II, will surface in Q1 of 1999, running at a clock speed of 450MHz or 500MHz. Intel is targeting it at the enthusiast and high-end mainstream performance categories. The extra speed will allow it to offer a small performance advantage over Pentium II on typical PC applications, and a large advantage on applications that use the multimedia extensions known as Katmai New Instructions.

Katmai is more than a faster processor. It signals the convergence of new chipsets, DRAM technology, a graphics bus, MMX instruction set, graphics components and a faster system bus. It will be a P6 derivative, initially produced on a 0.25 micron process, and is expected to provide up to 512Kb of L2 cache. It is believed that it will stick with a 64-bit CPU bus and rely on deeper pipelining capabilities to take advantage of wider buses and encourage the use of multiprocessing systems. There will be 70 new single-instruction multiple-data (SIMD) floating-point instructions to accelerate 3D processing. Intel's current MMX instruction set is based on SIMD integer data types, and while this is useful for presenting certain

Intel is targeting Katmai at the enthusiast and the high end

audio, video and 2D images, it provides less precision and range for 3D geometry processing. Graphics performance will be further boosted by the 4X Accelerated Graphics Bus, which will increase the available bandwidth between the graphics controller and main memory from 528Mbps to 1Gbps.

● **Katmai and 3D**

Although Katmai's main claim to fame is vastly improved 3D performance, some have claimed that it still won't be enough. The debate centres on the geometry front-end of Katmai's 3D pipeline where transforms and lighting are calculated. Normally, 3D geometry and lighting (a component of primitive triangle calculation) are the exclusive preserve of the CPU, but our group-test findings confirm what graphics chip vendors have been saying: that the CPU has topped-out its ability to churn out

more triangles at a rate that can keep up with the latest 3D processors.

By the time Katmai is released, new graphics accelerators which include geometry and lighting hardware are expected to be available from the likes of S3, 3DLabs, 3Dfx Interactive and perhaps Nvidia. The chip vendors argue that Katmai will be too expensive for the basic domestic PC and a separate geometry engine is a cheaper and faster solution. They allege that the best the first generation of Katmai will offer is a "maximised Voodoo2 class of subsystem" and won't offer significant 3D performance advantages — perhaps at best, a 60 percent improvement in the front-end of the geometry stage, according to 3DLabs. This is a marginal gain, considering that today's most

advanced 3D processor chips can handle about four times as many triangles as the processor can send. That they maintain this deficiency is down to the inherent weakness of a general-purpose CPU, even one with the vector-processing capabilities of Katmai, in processing more triangles. Geometry processing inevitably means many exceptions, and a hardware geometry engine, by contrast, is more adept at handling those exceptions because it has dedicated transistors assigned for the task. Intel counters this by maintaining that a balanced system keeps the transform-and-lighting burden in the CPU and that the floating-point-intensive Katmai instruction set should erase any doubt that the CPU can handle those functions. It has downplayed the naysayers' approach as expensive and unnecessary for most systems.

The vast majority of 3D development is directed naturally towards games software, and Intel is hoping to woo 3D-game developers to optimise their software for what it considers to be the premier PC platform for 1999. Such a system would include the 100MHz 440BX chipset, the i740 3D graphics processor and a Katmai processor running at 500MHz. Intel is devoting lots of resources to providing decent compilers and development tools, something it didn't quite deliver for MMX two years ago. Later this year, Microsoft will provide a version of Direct3D 6.0 with a .DLL file that will take advantage of SIMD floating-point instructions on the microprocessor, both Intel's Katmai and the separate instructions being developed by AMD, Cyrix and IDT.

▲ **BREATHE MORE LIFE INTO YOUR PC WITH KATMAI**

Table of features

MANUFACTURER	ARMARI	ATLANTIC SYSTEMS	COMPAQ	DAN TECHNOLOGY	DELL
MODEL NAME	MBX-450 WORKSTATION	PROTEUS 450LVD	DESKPRO EP SERIES 6450	DANTUM II/WSU	PRECISION WORKSTN 410
Price (ex VAT)	£2,899	£2,499	£2,050	£2,542	£3,390
Price (inc VAT)	£3,406.33	£2,936.33	£2,328.75	£2,986.85	£3,983
Telephone	0181 810 7441	0990 134725	0845 270 4000	0181 830 1100	0870 9073335
Fax	0181 810 8846	01639 821300	0845 270 4700	0181 830 1122	01344 723715
Web address	www.armari.com	www.atlanticsystem.com/sys/	www.compaq.co.uk	www.dan.co.uk	www.euro.dell.com
HARDWARE SPECS					
Processor	Intel PII 450	Intel PII 450	Intel PII 450	Intel PII 450	Intel PII 450
RAM/Type/No of DIMMs	128Mb / SDRAM / 1	128Mb / SDRAM / 2	128Mb / SDRAM / 1	128Mb / SDRAM / 1	128Mb / SDRAM / 1
Hard disk	Seagate Cheetah	Seagate Cheetah	Maxtor	Seagate ST39102LW	Quantum 8.5Gb
Size/interface	9.1Gb, Ultra2 SCSI	9.1Gb / Ultra2 SCSI	10Gb / Ultra ATA	9.1Gb / LVD Ultra2 SCSI	8.5Gb Ultra2Wide LVD
Storage drive	Seagate Hornet 8 Travan	LS-120 Superdisk	N/A	Seagate Tapestore T8000	Seagate
Size of storage drive media	8Gb	120Mb	N/A	4Gb / 8Gb	3.5 X 1
Storage drive interface	IDE	IDE	N/A	SCSI	SCSI
MOTHERBOARD COMPONENTS					
Motherboard manufacturer	ASUS	Intel	Compaq	Supermicro	Dell/Intel
Model/Chipset	P2B-DS / 440BX	SE440BX / 440BX	Intel 443BX	P6DGU / Intel 440GX	BX440
L2 Cache	512K	512Kb	512Kb	512K	512kb
No of free 3.5/5.25in bays	1 / 1	2 / 1	1 / 1	1 / 4	3 / 2
AGP slot	1	1	1	1	1
No of free PCI/ISA/shared slots	4 / 1 / 0	2 / 0 / 0	3 / 0 / 1	3 / 0 / 0	3 / 1 / 1
No of USB/Serial/Parallel/PS2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2
MULTIMEDIA					
CD-ROM	Plextor CD Writer	Traxdata CD and DVD-ROM	Compaq	Teac 32S	NEC
CD-ROM speed/interface	4/12 MAX / SCSI	2x/2x/6x / SCSI	32 x / IDE	32x / SCSI	16/32 SCSI
Sound card manufacturer	Creative Labs	Creative Labs	Compaq	Creative Labs	Crystal
Sound card model	AWE64 Value	AWE64	16-bit Premier Sound	AWE64 OEM	4237B SRS 3D
Speakers	Yamaha YST-MS25	Generic 300W speakers	Internal	Dan Hi Fi	Altec Lansing (optional)
Graphics card	Matrox Millennium G200	Matrox Millennium G200	Matrox Millennium G200	Matrox Millennium G200	Integraph Intense 3D Pro
RAM/Max RAM and type	16Mb / 16Mb SGRAM	8Mb / 16Mb SGRAM	8Mb / 16Mb SGRAM	8Mb / 16Mb SGRAM	16Mb / 16Mb SGRAM
Graphics card interface	AGP	AGP	AGP	AGP 6P	AGP
Monitor /size	Iiyama Vision Master 450/19in	MAG DJ-800 / 19in	Compaq P75 / 17in	CTX / VL950 / 19in	Dell (Trinitron) 17in
Max refresh rate at 1,024 x 768	120Hz	105Hz	85Hz	113Hz	85Hz
Max refresh rate at 1,200 x 1,024	94Hz	80Hz	85Hz	85Hz	85Hz
Max refresh rate at 1,200 x 1,600	80Hz	69Hz	75Hz	75Hz	60Hz
OTHER INFORMATION					
Modem	Diamond Supra Exprs PCI	Generic	N/A	Pace 56/V90 Internal Voice	Optional
Modem speed	56.6Kbps	56Kbps	N/A	56Kbps	Optional
Misc hardware	N/A	Headset and microphone	N/A	3Com 3C905 10/100 Ether	Adaptec U2W RAIDPORT
Bundled software	Windows NT4	Windows NT4	Windows NT4	Windows NT4	Windows NT & 95
		Lotus SmartSuite 97		Quicken 6.0 SE	
		Corel Draw Suite , AntiVirus,		Lotus SmartSuite 97	
		IBM Via Voice,			
		Pipex Dial			
Standard warranty	1yr OSM	1yr collect & rtn, parts & lab	3yr parts & replacement	1yr OSM	3 yrs (2-yr RTB)
		4yr RTB labour	(1st yr OSM)		1yr next business day
Warranty options	Up to 3yr OSM	5yr parts & lab, OSM	3yr OSM,	N/A	UK - 1yr, (4hr +£75)
			next business day OSM		to 3yr (4 hr +£210)
Tech support tel no	0181 810 6491	01639 823030	0845 2704000	0181 830 1100	01344 724730

Table of features
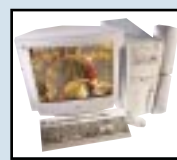
Manufacturer	Evesham	Hewlett-Packard	Hi-Grade Computers	Mesh	Viglen
Model Name	**Vale Platinum SE**	**Kayak XA-S**	**Axion PV2 450**	**Elite 450DS19**	**Viglen BizPro 450ks**
Price (ex VAT)	£2,599	£2,300 (sys) + £1,255 (mon)	£2,195	£2,528	£1,849
Price (inc VAT)	£3,053.83	£4,177.13	£2,579.13	£2,970.40	£2,172
Telephone	01386 769600	0990 474747	0181 532 6100	0181 208 4706	0181 758 7000
Fax	01386 769795	0141 420 2595	0181 532 6101	0181 208 4493	0181 758 7080
Web address	www.evesham.com	www.hp.com/go/kayak	www.higrade.com	www.meshplc.co.uk	www.viglen.co.uk
Hardware Specs					
Processor	Intel PII 450	Intel PII 450	Pentium II 450	Intel PII 450	Intel Pentium II 450
RAM/type/no, of DIMMs	128Mb / SDRAM / 1	64Mb / SDRAM / 2	128Mb / SDRAM / 1	128Mb / SDRAM / 1	128Mb / SDRAM / 1
Hard disk	Cheetah Ultra2	Seagate Medalist 6530	IBM	IBM Ultra Wide SCSI	Seagate 9Gb SCSI
Size / interface	9Gb / SCSI LVD	6.4Gb	9GB Ultra 2 SCSI	18.8Gb / UltraWide SCSI	9Gb / SCSI
Storage drive	Jazz / Iomega	N/A	HP 4000i	HP Travan	HP Travan T4000
Size of storage drive media	2Gb	N/A	4 Gb	4Gb	8Gb
Storage drive interface	SCSI	N/A	SCSI	SCSI	SCSI
Motherboard Components					
Motherboard manufacturer	Chaintech	Hewlett-Packard	ASUS	ASUS	Viglen OEM
Model/chipset	6BTML / Intel 82440BX	HP XA-S / Intel 440BX	P2B-DS / Intel BX	P2B-DS / Intel 440BX	Vig 69 / (Intel AL440BX)
L2 Cache	512Kb	512Kb	On Processor 512K	512Kb	CPU 512K
No of free 3.5/5.25in bays	4 / 2	1 / 2	0 / 1	1 / 1	2 (I internal) / 1
AGP slot	1	1	1	1	1
No. of free PCI/ISA/shared slots	4 / 1 / 1	2 / 1 / 0	2 / 2 / 1	3 / 1 / 0	3 / 1 / 1
No. of USB/Serial/Parallel/PS2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2
Multimedia					
CD-ROM	Panasonic SR8582-B	Hitachi CDR	Teac	Teac	Panasonic CR586
CD-ROM speed/interface	20xCD, 2xDVD / ATAPI	32x / IDE	32x / SCSI	32x / SCSI	32X ATAPI EIDE
Sound card manufacturer	Creative Labs	HP (Integrated)	Genius	Creative Labs	Mutiwve 3D PCI wve tble
Sound card model	AWE64 Value	SB Pro compatible	Genius 3D 64 PCI	Sound Blaster Vibra 16	3D PCI wave table Aureal
Speakers	Yamaha YSTMS25	N/A	N/A	Yamaha YST-M20 DSP	Yamaha M25 + subwoofer
Graphics card	Matrox Millennium G200	Matrox Productiva G200	Matrox Millennium G200	Diamond Fire GL 1000	Matrox Millennium G200
RAM/Max RAM and type	8Mb / 16Mb SGRAM	8Mb / 16Mb SGRAM	8Mb / 8Mb SGRAM	8Mb / 8Mb SGRAM	8Mb / 16Mb SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor /size	Taxan / TCO975 / 19in	HP / P1100 / 21in	Iiyama VisionMaster 450/19in	ADI / 6P / 19in	Viglen OEM Envy 19D
Max refresh rate at 1,024 x 768	117Hz	129Hz	120Hz	120Hz	100Hz
Max refresh rate at 1,200 x 1,024	88Hz	98Hz	94 Hz	85Hz	85Hz
Max refresh rate at 1,200 x 1,600	75Hz	85Hz	80 Hz	75Hz	75Hz
Other Information					
Modem	Vale 56K internal	N/A	N/A	N/A	Viglen OEM 56K ISA
Modem speed	56Kbps	N/A	N/A	N/A	56Kbps
Misc hardware	Ultra2 SCSI contrllr onboard	Network adapter card	3COM 3C905 TP NIC	Intel Eth Exprss Pro 10/100	
Bundled software	N/A	Windows NT4,	Lotus SmartSuite 97	Windows NT4	Microsoft Intellimouse
		HP TopTools,	IBM World Book,	Lotus SmartSuite 97	Windows NT 4.0
		HP Maxilife,	VoiceType		
		Adobe Acrobat			
		McAfee VirusScan			
Standard Warranty	2yr OSM +	1yr OSM, 2yr parts	1yr on site (next day)	3yr RTB parts/labour	12 mths collect and return
	lifetime tech support				
Warranty Options	Optional 3rd yr OSM	Extended warranty	N/A	1yr OSM £49	Upgradable to 4 hr OSM
				+ other options	
Tech support tel no	Available when purchased	0990 474747	0181 532 6199	0181 208 4795	0181 758 7053

Why Windows NT and not 95?

What makes Windows NT different to Windows 95 and 98? Although they look similar, there are actually a number of differences. To begin with, unlike 95, NT controls hardware directly without using the system's BIOS. This is a secure technique but it makes NT particular about hardware. Microsoft even provides a list of compatible hardware at www.microsoft.com. You must be sure your hardware is properly configured and has no internal address conflicts: unlike 95, NT does not support plug-and-play (although NT5 will), so it cannot automatically detect or change settings. As a result, if something is not set up properly, the system could

lock up. NT suffers from poor, or even non-existent, device drivers. The specialised Backup facility lets you save information to your local tape drive and the Performance Monitor enables you to monitor the performance of all computers on your network. Disk Administrator lets you view and configure the partitions on your hard drive, dispensing with the need for third-party applications when running Windows 95. With User Manager, you can manage security for a network of NT computers, creating accounts and user rights. Event Viewer keeps track of significant occurrences in a program, or in the system, of which you need to be aware.

PCW Labs Report

SYSMark 95 scores — Bigger is better

	SCORE
ARMARI	211
ATLANTIC	204
COMPAQ	199
DAN	222
DELL	197
EVESHAM	152
HI-GRADE	197
HP	194
MESH	205
VIGLEN	201
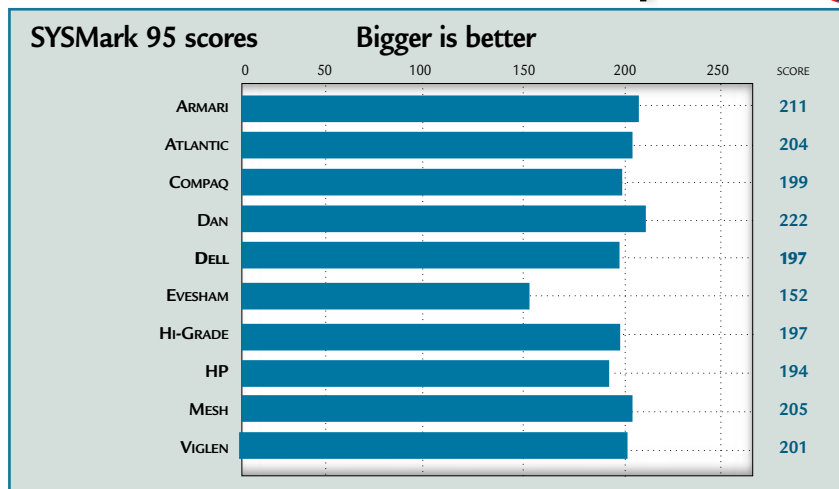
How we did the tests

The SYSmark tests we run on every PC in the group test is provided by BAPCo (Business Applications Performance Corporation). The tests measure the speed of the PC running a series of eight common office applications. We measure the time taken by the PC to perform a variety of tasks in each application and each test is performed three times to ensure the results are consistent. The performance depends on a number of factors: processor speed, RAM, graphics card and disk I/O. As the tests are based on business software packages, the results reflect how the PC will perform in a real-world situation. The better the score, the longer the bar on the graph. More information about the BAPCo suite of tests can be found at www.bapco.com.
Although Windows 95 and NT are compatible and will run many of the same applications, there are a fundamental differences between the two. The most basic is the way in which it writes files to disk. Whereas Windows 95 uses the outdated FAT (File Allocation Table) convention, NT4

instead employs NT File System, allowing longer filenames based on Unicode characters. Active Directory will form the backbone of NT5 upon release, including support for the Domain Name System (DNS) and standard protocols like HTTP to make networks, the internet and the file system integrate closer than before. It will also support an extended set of graphics handling commands, allowing the use of many games currently only available to Windows 95 / 98 users. Because of these differences, our tests for Windows 9x and Windows NT are written specifically to suit each OS.
NTFS is a very secure file system which, because of the space it uses, is not recommended for disks under 400Mb. It works well on large drives, though, because of the efficient way in which it handles files. There may be a performance issue involved in the choice of FAT or NTFS under NT 4.0, with some PC manufacturers claiming that the former gives better performance, albeit at the cost of reduced security. Monitors are scrutinised using Display Mate for Windows and tested at a number of resolutions and colour depths.

Editor's Choice

We get down to the business of choosing the best of a very fine bunch.

A wide variety of prices, specifications and approaches were employed by our suppliers in building these machines. While many opted for SCSI drive connections, others followed the less impressive IDE route. Some took our spec to be purely business-orientated and so did not include speakers or, in many cases, even bundled software. Some, like Evesham and Dan, had used large cases to allow for the maximum upgradability, but the likes of Dell and HP had instead opted for much smaller models, suitable for smaller offices or home environments. In a business situation, most IS departments would be likely to favour the latter approach as there is little need for more peripherals and drives in a purely business machine.

Although the top five performers in our BAPCo tests were all SCSI-based machines, the margin between the fastest of these and the first-placed IDE PC was a mere 23 points. SCSI does not always pay off, we found, with Evesham's SCSI machine coming at the bottom of the list, making us wonder whether this "super-fast" technology is actually worth the little extra you often have to pay. It has long been an established fact that a powerful graphics card plays a large part in enhancing the performance of a PC, and four of the five fastest machines reviewed here incorporated the brand new Matrox Millennium G200, which wins a Highly Commended award in this month's graphics card group test [p190]. It is important, therefore, to consider the components of the PC as a whole rather than as individual parts, because a single slow component can slow down the performance of an otherwise impressive machine.

The one manufacturer which impressed us the most overall, and is thus our Editor's Choice, is **Atlantic**. Its **Proteus 450 LVD** is a well-specced machine with every PC gadget you could hope for, including a large, fast hard drive, a CD-RW drive and, looking to the future, DVD-ROM. Rather than a standard floppy drive Atlantic had opted to replace it with an LS-120 offering 120Mb of instantly accessible backup storage which can be used as a conventional drive. The AWE 64 sound card and 300W speakers provided for excellent sound reproduction,

THE
ATLANTIC
PROTEUS
450LVD

▲THE ARMARI
MBX-450
WORKSTATION

while the 19in MAG monitor attained an impressive refresh rate at very high resolutions. Even the generous software bundle did not raise the price of this breathtaking system above the £2,500 mark (before tax).

The Armari MBX-450 Workstation is Highly Commended. This sturdy machine performed well in our tests and, complemented by the excellent Iiyama Vision Master 450, it

The Atlantic Proteus 450LVD is a well-specced machine with every PC gadget you could hope for

was easy on the eye. The dual-processor-capable motherboard (although, at our request, not implemented in this model) offers an impressive upgrade path for power users.

Dell's Dantum II/WSU is also Highly Commended. Although not particularly fast, its innovative design enables easy access to the interior, allowing you to upgrade the standard configuration and take advantage of the five free PCI slots, facilitated by the inclusion of onboard SCSI.

▲THE DELL
DANTUM
II/WSU

Vision on
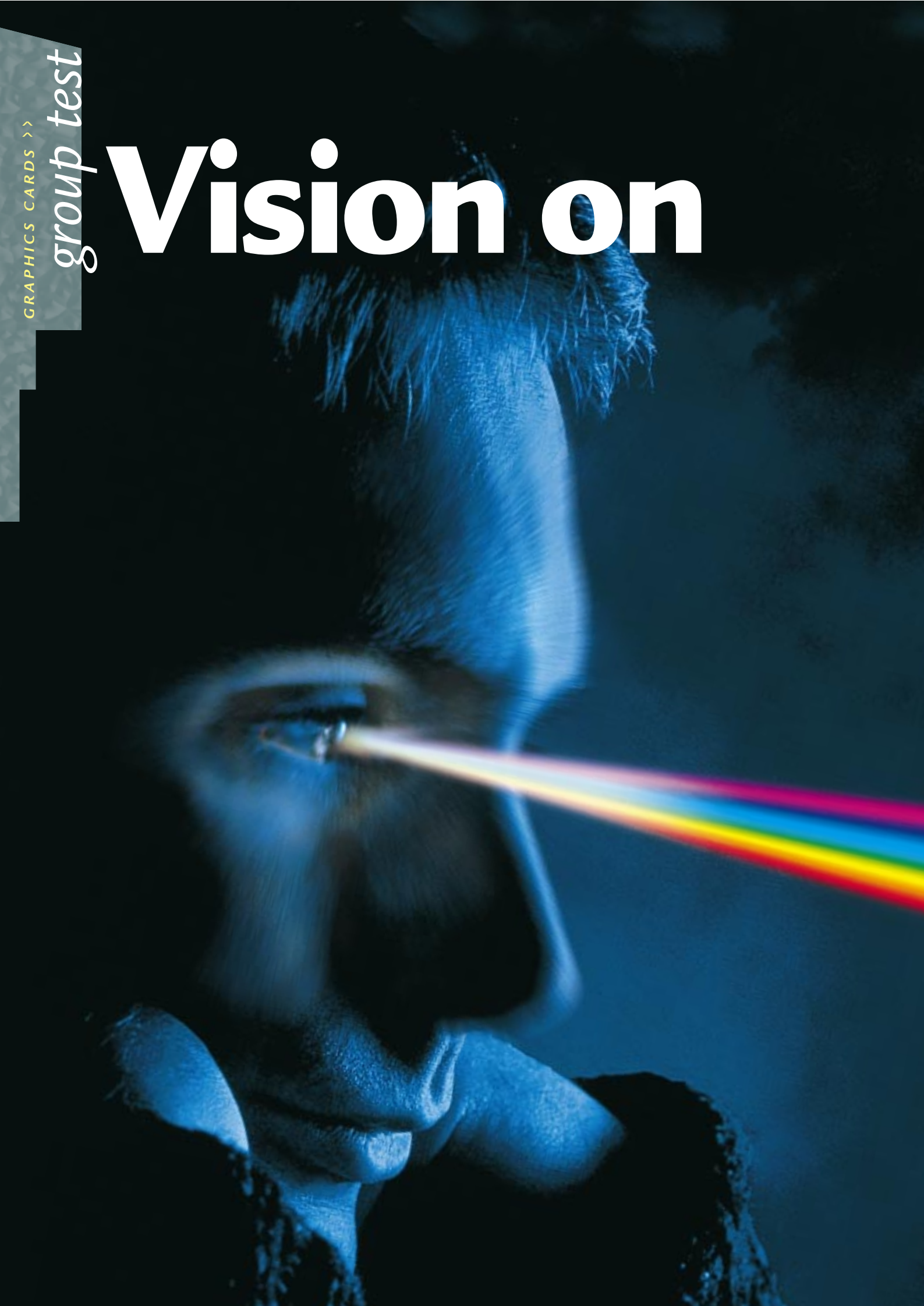
If you want to stay ahead of the game, then you need to be well-equipped with a top-notch graphics card. Ajith Ram and David Fearon see how they run.

In a fast-moving industry, graphics technology is one of the fastest-moving elements. As far as Windows desktop performance goes, things have gone pretty much as far as they can: no-one can tell the difference between any modern card when using office applications. The realm of innovation is 3D graphics, which primarily means games.

There are three basic kinds of graphics card these days. The most basic, and cheapest, is the 2D-only adaptor, which is fine if you only use your PC for work and the odd game of Solitaire. The most cost-effective solution for the gamer are 2D/3D combo cards, which combine standard 2D functions plus 3D acceleration capabilities on one card. Almost all new cards have some kind of dedicated 3D acceleration, but their performance varies a lot. For the serious gamer, or those who already have a 2D card and want to upgrade to 3D, there's also the option of dedicated 3D add-on cards, which work alongside your existing adaptor. At the moment, these are mostly based on the 3Dfx Voodoo2 chipset.

If you have a PC bought within the last six to eight months, you probably have an AGP slot on your motherboard. AGP stands for Accelerated Graphics Port. It's a dedicated slot for graphics cards and gives slightly higher performance for some games. AGP is covered in more depth on page 196.

We've tested fifteen of the latest cards, as well as reviewing some of the latest 3D technologies and standards. A development which is just over the horizon is the digital interface standard for connecting LCD panels to a graphics card digitally to get the best picture quality. None were available at the time of writing, but expect announcements from both graphics-card and LCD-panel manufacturers soon.

Contents

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

3D engines & geometry acceleration

One of the last areas where today's hardware struggles, is when keeping up with the demands of 3D-intensive software like games. While most business applications can run quite happily on a 486, even today's fastest desktop processors struggle to keep up with the complex calculations involved in depicting 3D images. The reasons for this are many. Unlike static 2D images like text in a word processor, moving 3D images require the CPU to perform a series of complex calculations. Moving 3D images are rendered in a series of stages which are often described using terms like bi-linear filtering, tri-linear filtering, bump mapping and mip mapping. Let's take a look at some of these techniques.

● Geometry setup

Geometry setup is the first and most important step in creating a 3D image. During this stage, the 3D objects are placed in 3D space. 3D space, unlike 2D, is a three-axis (X, Y, Z) area. Within this space, geometry setup performs three functions — scaling, translation and rotation.

☛ **Scaling** makes objects bigger or smaller according to how far back they are in the field of view.

☛ **Translation** involves moving the object to its correct location.

☛ **Rotation** turns the object so that it attains its correct position.

In a game with twenty different objects on-screen at any given time, the CPU has to complete each of the above procedures for each object. And if this weren't complex enough, computer screens refresh at more than seventy times a second. Therefore, any changes in the position of these objects must also be calculated and displayed for every refresh of the screen.

● Triangle Setup

Triangle Setup converts the data created by the geometry setup into a form that can be input into a 3D accelerator. Some graphics cards, such as the Voodoo2, Millennium G200 and Power VRSG, have their own triangle setup engines which take some of the strain away from the CPU. However, even these triangle setup units are able to process only a small section of the data: the rest must be handled by the CPU.

● Texture Mapping

This is a technique for adding extra detail to the 3D object. It is best described as wrapping a 2D coloured paper over a 3D object. For instance, if you had a 3D image of a car on-screen, a texture would be wrapped over it to depict coloured metallic paint. This process is painstaking, as it has to be repeated for every pixel on the object and each pixel of the texture, known as a texel, which lies on top. Many textures can be wrapped over the same object, and this is multitexturing. Some games, like Quake2, take advantage of multitexturing. The best results are obtained when the game is accelerated using hardware like the Voodoo2. A 2D/3D card like the Millennium G200 offers multitexturing.

● Mip Mapping

A mip-map is a cut-down version of a texture, and map-mapping is a trick used to create more texels without performing the equivalent number of calculations. If a mip-map is one fourth the size of the original texture, reading a single texel from this mip-map is the same as reading four texels from the original texture. If applied using proper filters, the image quality is actually higher, as it smoothes out jagged edges.

● Bi-linear Filtering

This technique reads four texels, calculates their average — that is, the average of their relative positions — colour and so on, and displays the result as a single-screen texel. This results in blurring at close quarters, which in turn reduces an otherwise blocky, pixellated appearance. Bi-linear filtering is now standard on most PC graphics cards.

▶**WITH B-LINEAR FILTERING TURNED OFF**

▶**WITH BI-LINEAR FILTERING TURNED ON**

● Z-buffering

Z-buffering is a method of calculating pixels which have to be loaded into the frame buffer, the memory that stores soon-to-be-displayed data. 3D accelerator chips take one pixel, render it, and proceed to the next one. The problem with this method is that the accelerator has no way of knowing whether the calculated pixel is to be displayed immediately or later.

Z-buffering includes a "Z" value in every calculated pixel. If the Z value for a particular pixel is smaller than another one, it means the pixel with the smaller Z value must be displayed first.

● Anti-aliasing

Anti-aliasing is a technique to reduce the "noise" present in an image. To represent any image, a certain amount of information is needed. If the object is in motion, ideally, that information should include its every possible position, colour, size changes etc. But if this information is not available, the CPU often fills in the missing segments with meaningless noise. Anti-aliasing, along with mip mapping, removes this noise.

● **Gouraud shading**
A technique to make objects appear more solid by applying shadows to the surface of the object. The algorithm determines the colours of adjacent polygons and makes a smooth transition between them. This ensures that there is no sudden change in colour over the object.
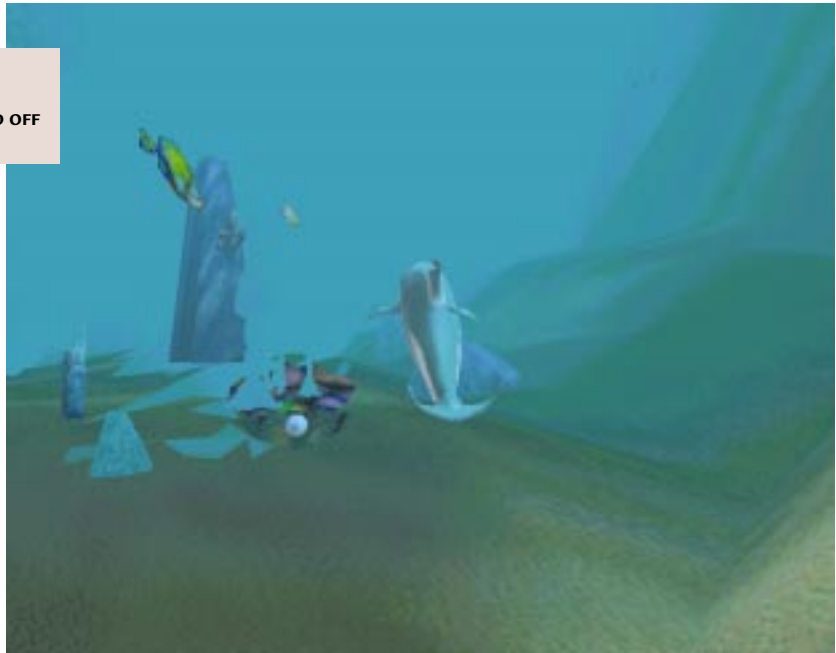
● **Bump mapping**
This method gives a "bumpy" look to surfaces. For instance, a bump-mapped mountain can have realistic-looking furrows and protrusions on its surface. However, the industry is yet to arrive at a standard set of procedures to render this visually impressive feature.

It is obvious that these techniques involve complex calculations which stretch a CPU's capabilities. Even with dedicated 3D accelerators performing many of the above functions, the CPU is still the biggest bottleneck to better graphics. The main reason for this is that the CPU handles most of the geometry calculations — that is, the position of every filtered, mip-mapped, bump-mapped and anti-aliased pixel that appears on-screen. With current 3D accelerators spewing out over a 100 million pixels per second, this is beyond the abilities of even the fastest CPUs. The 3D accelerator literally has to wait for the

▶**WITH THE Z-BUFFER TURNED OFF**

CPU to finish its calculations. There are two very different means of getting over this problem, advocated by two distinct parties. The most affected parties, the 3D-hardware manufacturers, want to use dedicated geometry processor, such as the Pinolite from Fujitsu incorporated in the Hercules Conspiracy graphics card. Such

▶**WITH THE Z-BUFFER TURNED ON**

processors take over the 3D calculations from the CPU. On the other side of the debate, this is the least acceptable solution for CPU manufacturers, particularly Intel, because once geometry processors become standard on graphics boards, it only takes a mediocre processor to perform other functions such as running the operating system and monitoring devices. This eliminates the need for gamers and CAD/CAM professionals to constantly upgrade to faster CPUs.

◀**WITH FLAT SHADING**

◀**WITH GOURAUD SHADING**

Recognising a threat to a major source of revenue, Intel has proposed its upcoming Katmai processor as a solution. Like AMD's 3D Now!, the Katmai has 70 new MMX-style instructions (KNI) that speed

up 3D calculations. Intel claims that KNI will provide a performance increase of between 40 and 100 percent. But the problem is that even if the performance boost is a full 100 percent as Intel claims, it still may not be sufficient to cope with the brute power of the new 3D accelerators.

Some experts estimate that today's accelerators, like the new Millennium G200 and the Voodoo2, require CPUs twice as fast as those available. Therefore, when Katmai débuts next year with speeds around 450MHz, even its better 3D performance won't be sufficient to deal with the next generation of 3D accelerators. Furthermore, most users, even gamers, do not upgrade regularly and have CPUs which are relatively slow. Therefore, the best solution appears to be dedicated geometry processors. With major firms like S3 reportedly working on incorporating geometry processing into their graphics boards, this is almost certainly the way the industry will move. And that is bad news for Intel.

Graphics standards

The hard facts about the software involved with graphics cards and 3D graphics.

It's all very well being surrounded by the latest and most advanced 3D hardware, but of course hardware by itself isn't much use to anyone. What makes a product really useful is the software. There are two distinct layers to the software involved with graphics cards and 3D graphics — the APIs, and the applications. There's a lot of talk among the 3D-graphics fraternity about the merits and demerits of the various 3D APIs. An API (Application Programming Interface) is a piece of software that lets programmers communicate with a device — in this case, a graphics card — using a standard set of commands, enabling them to harness the power of the hardware as easily as possible.

Three different APIs dominate the 3D graphics world as far as the home user is concerned — OpenGL, Direct3D and Glide. There are other standards, but they are less prevalent. For professional uses of 3D graphics, notably 3D design and animation of the type used in film and television, OpenGL is the most-used API. It stands, predictably enough, for Open Graphics Language. Windows 95 OSR2 and Windows 98 both understand OpenGL commands, so applications that use it will work even if you don't have any specific 3D hardware. Being an open standard, it is used on many platforms, from PCs running Windows to high-end Silicon Graphics and Sun workstations running Linux, Solaris, or one of the many other types of Unix. Its open nature is its main strength, and developers prefer it because it's well understood and relatively easy to develop applications that use it.

Unless you're into 3D design, the only time you're likely to use OpenGL is when playing Quake II (*see below*). But if you're thinking of getting into applications like TrueSpace, Infini-D or LightWave, make sure that the graphics card you go for has a set of OpenGL drivers, since you can then use the hardware acceleration features for real-time shaded and textured previews, making working in three dimensions much easier.

At the slightly less esoteric end of the scale is good-old Direct3D. This is part of a set of APIs known as DirectX. DirectX is written by Microsoft, and is therefore only available on PCs running Windows 95, 98 or NT. It's primarily a games API, and comprises Direct3D, DirectSound, DirectInput (for input devices) and a couple of others. Windows NT4 only supports version 3. But for Windows 95 and 98, as well as the upcoming NT5, DirectX is now up to version 6.

Many developers have traditionally hated DirectX: they cite its complexity, lack of decent documentation, bugs and inconsistencies. In particular, id Software, the developer of Quake and Quake II, chose to use a subset of OpenGL rather than Direct3D for Quake II.

A real, practical 3D Windows interface is unlikely to happen for at least five years

While going through its first few incarnations, you'd often see letters in magazines such as *PCW* with the title "DirectX ruined my life". This was

because of its propensity for completely fouling up people's PCs — particularly the graphics drivers — when they tried to install it, which they had to do if they wanted to play the latest games. But from version 5, DirectX has been much better behaved. With version 6, some developers have even said that it's now quite good. Either way, with the enormous pressure Microsoft has been able to bring to bear on games developers and the industry in general, there's no question of being able to avoid DirectX and Direct3D. It's a standard part of Windows 98, anyway.

Glide is a specialised but nonetheless important API. It is specific to 3Dfx's Voodoo Rush and Voodoo Graphics chipsets and doesn't work with any other cards. But since 3Dfx is still the card of choice for so many gamers, a lot of games have either Direct3D and Glide support, or support for Glide only. Certainly, in the "early days" of 3D hardware (about a year ago) there was nothing to touch the speed or quality of 3Dfx, so implementing Glide-only versions of games made sense. Now that the competition is catching up, there's more of a slant toward Direct3D games. But many games which give the option still look better in Glide mode if you have a 3Dfx card.

In a similar vein to Glide is an API called PowerSGL. This is the interface used by cards based on NEC's PowerVR chipset. Despite a great deal of marketing hype, PowerVR has failed to make a huge impression on the gaming fraternity in the manner of 3Dfx, but there are games, notably Unreal, that specifically support it.

◀ **The makers of Quake II spurned Direct 3D in favour of a subset of OpenGL**

▼ **Microsoft's Flight Simulator, which uses the company's own DirectX**

If you're considering a Voodoo 2-based add-on card, remember that these cards are for gaming only: they completely take over the display when in 3D mode, so you can't use 3D features in a desktop window. This rules them out for 3D design applications. Conversely, if you have a 2D/3D combo card and you don't want to dabble in anything other than 3D games, you won't need more than 8Mb of video memory on the card. 8Mb lets you run double-buffered, Z-buffered 3D games at 800x600 resolution, which is more than adequate for the lifetime of any current card. It's only when you need to run 3D applications at the more normal Windows desktop resolutions, 1024x768 or 1280x1024, that you'll need 12Mb or above.

But with all these millions of R&D dollars that the graphics-card manufacturers are spending on the design and fabrication of ever more complex 3D hardware, is the finished article always going to end up being used to get a few more frames per second out of Unreal and its successors? For the time being, yes. There's still no sign of any practical alternative to a 2D Windows desktop, despite the whizzy 3D interface that the girl in Jurassic Park used to override the security grid. A monitor is a two-dimensional surface, so a two-dimensional interface is the most practical thing to use; trying to navigate in a pseudo-3D environment is liable to confuse rather than help.

A real, practical three-dimensional Windows interface is unlikely to happen for at least five years. Those who've seen the film version of William Gibson's *Johnny Mnemonic* will remember the virtual reality glasses and actuator gloves that Keanu Reeves used to navigate Gibson's Cyberspace. It sounds cheesy, but this is what's needed to make everyday 3D virtual environments a possibility. The real problem, though, is not a technological but a social one. Will we really be able to suspend our self-consciousness sufficiently to be able to don a pair of goggles and poke at things in mid-air when we know our colleagues are watching?

PCI *vs* AGP

There has been some debate about the merits of an AGP graphics card over its PCI counterpart. Most of it has been fuelled by the performance (or lack of it) of the AGP cards. The 32-bit PCI slot with a maximum bandwidth of 128Mb/sec is showing its age on bandwidth-hungry components like graphics cards. The AGP slot (Accelerated Graphics Port), theoretically at least, eliminates the PCI's limitation by providing direct access into the PC's RAM.

With an AGP 2X specification, it is possible to get a peak transfer rate of 512Mb/sec, and with the new AGP 4X, the bandwidth increases to 800Mb/sec — almost eight times faster than PCI. However, as our tests proved, this does not translate into eight times better performance. One reason is that although the bottleneck of the PCI bus is eliminated, the RAM into which AGP provides direct access is still running at only 66MHz or 100MHz — four to five times slower than the processor. Also, there is the misconception that with an

AGP card, you can use the main memory rather than having extra memory on the graphics card itself. This is not so, as many graphics cards now have fast SGRAM running at 125MHz speeds. Hence, any extra data transfer from the slower main memory, even over the AGP bus, is bound to slow things down.

But this does not mean that the AGP slot is redundant. As new games that make use of larger textures appear, the memory on the graphics board may not be sufficient to hold them, even with 12Mb or 16Mb on the card. Then, AGP's

ability comes into focus, as its massive bandwidth helps in the transfer of large textures. So, if you are an avid gamer who intends to buy some of the upcoming titles, go for an AGP 2D/3D card like the Millenium G200 or the Banshee.
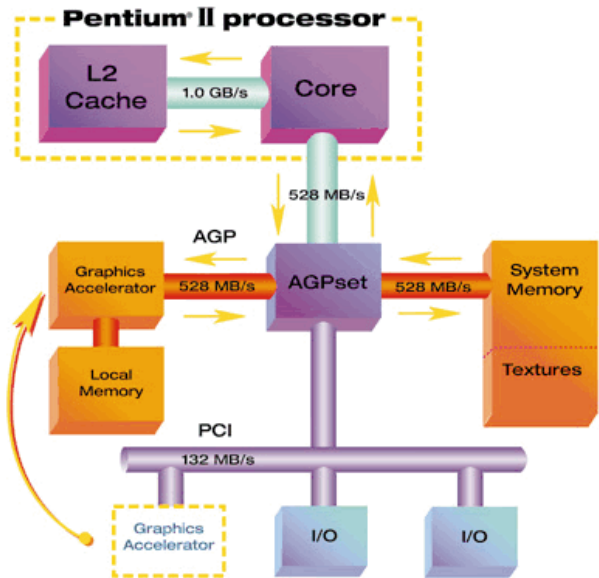
Multiple Graphics Cards

Until now, it was necessary to use a dedicated 3D accelerator (like Voodoo2) and a general 2D display card (like Millennium G100) to achieve high games performance and maintain flicker-free displays. The dedicated 3D card is connected to the main 2D card using an external pass-through cable. When not in use, the 3D card allows the video signal to bypass it and go into the monitor. However, when a 3D game is launched, the 3D accelerator kicks in and provides the display.

Our tests suggest that this age of separate cards is coming to an end. The new generation of display cards like the Millennium G200, Banshee and Savage 3D, in addition to being AGP compatible, offer 3D performance that is better than many dedicated 3D accelerators. However, there is still a niche market for dedicated 3D cards like Voodoo2. This is the realm of gamers who are never satisfied with *any* level of

performance. They opt for two Voodoo2 cards in SLI (Scan Line Interleaving) mode, where each card draws alternate lines on the screen, theoretically doubling the performance. Our tests show that the actual

increase is between 30 and 60 percent. However, even this market might disappear soon. With chipsets like the Riva TNT and the Permedia 3 on the horizon, with more power than even two SLI Voodoo2 cards, even die-hard gamers can be content with the same display cards as office users.

Windows 98 now supports multiple monitors. This is an ideal solution for PC video editors, stockbrokers and graphics designers who need multiple windows open at a time. In the old days, this feature was available only on the Mac. Most new cards like the Matrox Millennium G200 and the ATI Xpert98 have drivers optimised for this feature. It does mean using an extra PCI card for each additional display, though, as there is only one AGP slot.
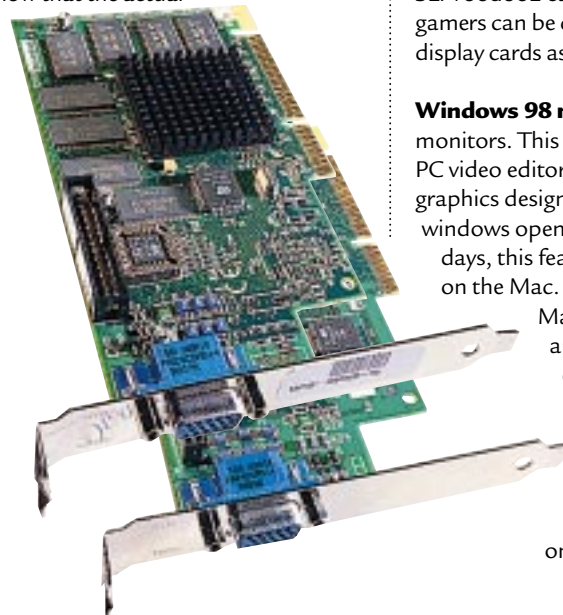
Graphics Cards
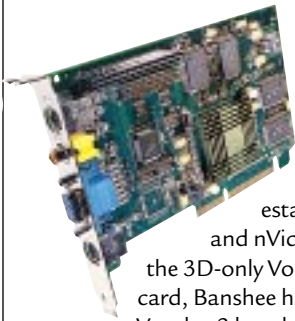
3Dfx Banshee BETA

The Banshee represents 3Dfx's latest foray into the 2D/3D market and is an attempt to woo OEMs away from established companies like Matrox and nVidia. Banshee's core is identical to the 3D-only Voodoo2. An AGP 1X graphics card, Banshee has a slightly higher fill rate than Voodoo2 but does not have a multitexturing unit. This means lower performance in games like Quake2 which use multitexturing. Our test board came with 8Mb of memory which was not upgradable, but this is likely to change. Banshee has a TV-out option, but does not have DVD motion assist. It was the fastest performer in our tests.
★★★★
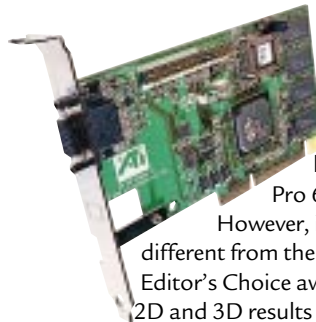
ATI Xpert98

The 8Mb ATI Xpert98 is the latest incarnation of the Rage Pro 64-bit RISC processor. However, its performance was not very different from the Xpert@Work which won our Editor's Choice award last year. Although the 2D and 3D results were adequate, it fell short of the standards set by the newer entrants like the Banshee. The picture quality was also less than optimal with poor bilinear filtering and anti-aliasing. However, the Rage Pro Turbo is one of the few chipsets that has true motion compensation for DVD playback. ATI also offers an inexpensive upgrade kit which includes a TV tuner.
★★★
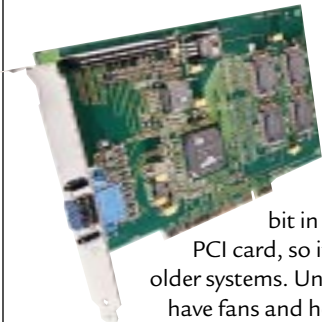
Creative Labs Graphics Blaster Exxtreme

Creative's card is based around the Permedia 2 chipset, which is getting on a bit in graphics-cards terms. It's a PCI card, so it may be better suited to older systems. Unlike the latest chipsets which have fans and heatsinks attached to them, the Permedia 2 chip needs no extra cooling. The card has 4Mb of SGRAM on-board. The relative age of the Permedia 2 is highlighted by the card's performance: with a Final Reality score of just 3.24, it's not speedy. The Incoming frame-rate test yielded just 30 frames per second, and the card wasn't able to run Forsaken at all.
★★

Diamond Stealth II G460

The G460 is Diamond's variation of the Intel i740 chipset. Unlike the Express 3D though, the G460 has 8Mb of RAM on-board. The card itself is fairly unremarkable: an AGP part, it doesn't have any extra inputs or outputs. Whereas the Express 3D has a heatsink and fan on the main graphics processor, the G460 just has a heatsink. Its Final Reality performance was very slightly behind the Express 3D, but not significantly so. In the game frame-rate tests, the G460's performance was moderate: it managed a respectable 59 frames per second with Incoming, and the Forsaken test yielded 28 frames per second at 1024x768.
★★

Diamond Viper V550

The Viper 550 is built on the new Riva TNT chipset which is meant to succeed both the Riva 128 and the Riva 128ZX. The board we tested was not a full production version and had beta drivers. However, even with these limitations, the Viper 550 proved to be an impressive performer. With a theoretical maximum fill rate of 180 million pixels per second, the TNT aims to beat the Voodoo2 SLI solution (*p220*). The Viper comes with 8Mb of memory and a high RAMDAC of 250Hz. However, unlike the Millennium and the Rage Pro, the Diamond board does not have motion compensation for DVD playback.
★★★★

Diamond Viper V330

Based on nVidia's Riva 128 chipset, the Diamond Viper had been a good performer in our previous group tests. However, this time around, its position was usurped by newer cards. Installing the V330 was slightly troublesome, as the drivers supplied were over two years old and would not work with Windows 98. We had to download and install the latest drivers from Diamond's web site. Although the Viper had above-average performance in both 2D and 3D, its image quality left much to be desired and was well below the Millennium G200 and the Banshee. It has a TV-out option, but does not have hardware DVD assist.
★★★

Graphics Cards
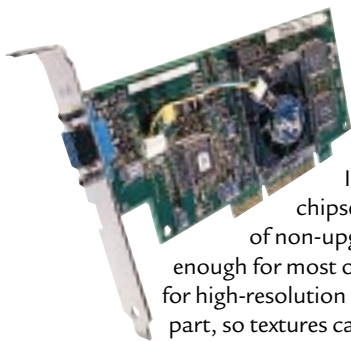
Intel Express 3D

Given that this card is made by Intel, it's no surprise that it employs Intel's own i740 graphics chipset. The card has only 4Mb of non-upgradable RAM, which is enough for most office applications but not for high-resolution 3D graphics. It's an AGP part, so textures can be stored in the PC's main memory. The i740's colour depth is limited to 256 colours at a resolution of 1280x1024, so hardcore business users won't want it. Its poor performance in real-world games means that hardcore gamers won't want it either. A card for undemanding home applications only.
★★
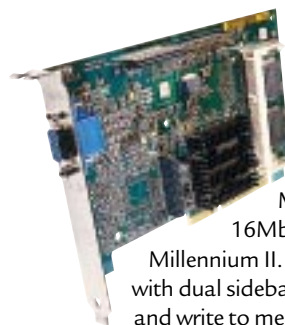
Matrox Millennium G200

Built around the new 128-bit G200 chipset, the 8Mb Millennium G200 (upgradable to 16Mb) is an ideal successor to the Millennium II. Featuring full AGP 2X support with dual sideband addressing (the ability to read and write to memory at the same time), the Millennium was the second-fastest board in our group test. With a high RAMDAC of 250Hz and 8Mb of SGRAM, it is targeted at office users. The G200 had the best picture quality among all the cards we tested. It also has motion-assist for software DVD playback. It supports both DirectX and OpenGL.
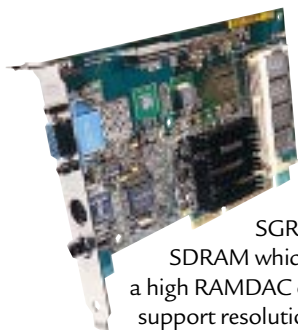
Matrox Mystique G200

Built around the same G200 chipset as the Millennium, the Mystique has a TV-out and is targeted primarily at gamers. While the Millennium has slightly faster SGRAM, the Mystique has 8Mb SDRAM which is upgradable to 16Mb. With a high RAMDAC of 230Hz, the card is able to support resolutions as high as 1600x1200. Like the Millennium, the Mystique had excellent image quality and fast 3D performance, which should please many gamers. It has hardware assist for DVD playback and supports both DirectX and Open GL. It comes with a software bundle that includes Motorhead and Tonic Trouble.
★★★★
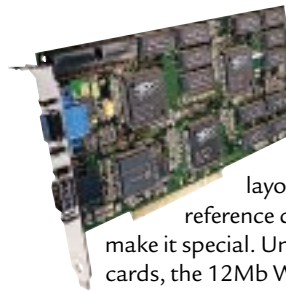
MegaByte Wicked 3D

Wicked 3D is the catchy name for this unique Voodoo2 board. The layout is identical to the 3Dfx reference design, but it's the drivers that make it special. Unlike all other single Voodoo2 cards, the 12Mb Wicked 3D is able to support a resolution as high as 1024x672. This is impressive, as even two Voodoo2 cards in SLI mode can support only 1024x768. Moreover, the drivers give you the ability to increase the refresh rate in 1Hz increments, so the user can take full advantage of their monitor's bandwidth. This card also supports Wicked Vision [see p200]. Wicked 3D produced the best results in our Direct3D tests.
★★★★
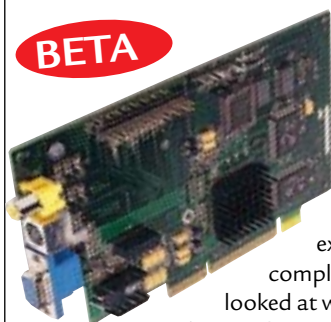
S3 Savage 3D – PREVIEW

BETA

The Savage carries S3's hopes of breaking back into the high-performance graphics market after a considerable lull. It's an extremely sophisticated and complex chipset, and the model we looked at was a pre-production reference design. Nonetheless, the card put in a very good performance, coming second only to the Banshee in the Incoming frame rate test and equalling it on the Forsaken benchmark. Its Final Reality result was less impressive, but given our card's pre-production status, we can't condemn it on that score. It looks as though the Savage will be a chipset to contend with: we'll test it again as soon as production samples are available.
★★★★
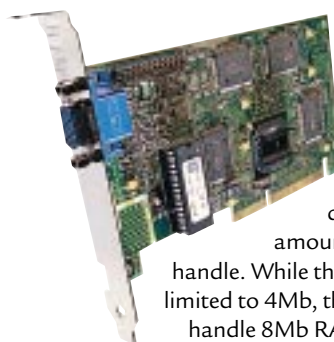
STB Velocity

The Riva 128ZX on the STB board, although a new chipset, is still only an enhanced version of the older Riva 128. The difference is mainly in the amount of memory that it can handle. While the Riva 128 boards were limited to 4Mb, the enhanced ZX is able to handle 8Mb RAM. We noticed little performance difference between the two chipsets. However, users who require higher resolutions might want to consider the new Velocity board. The picture quality of the card was identical to its predecessor. The Velocity does not have hardware assist for DVD playback.
★★★★★

Voodoo2 cards

How the magic works in the cards we tested.

Since its launch nearly six months ago, the Voodoo2 from 3Dfx has reigned supreme in the games arena. Even now, with the entry of more powerful chipsets like the Riva TNT, a Voodoo2 SLI solution is hard to beat. Of the five Voodoo2 boards we tested, the **Wicked 3D** proved to be the best in terms of features and performance. While other Voodoo2 cards offered a maximum resolution of only 800x600, the Wicked board supported 1024x672. This is only slightly less than the maximum resolution (1024x768) offered by even a Voodoo2 SLI solution. Moreover, the Wicked driver allows the user to increase the refresh rate in 1Hz increments. The board also supports Wicked Vision [below]. The **Canopus Pure3D II** was another board which stood out. In addition to excellent drivers, Pure 3D was the only Voodoo2

board that had a cooling fan and heatsink, making it a good choice for compulsive overclockers. The Canopus board was also the only one with a TV-out. Creative Labs was the first company to come out with a Voodoo2 board. Almost identical to the 3Dfx reference design, the **3D Blaster** supports a maximum resolution of 800x600 and has 12Mb of memory. Arowana is one of the later entrants into the Voodoo2 bandwagon. Identical to the reference design, the board posted respectable but hardly unexpected results. Like the Creative and Canopus boards, the Arowana board
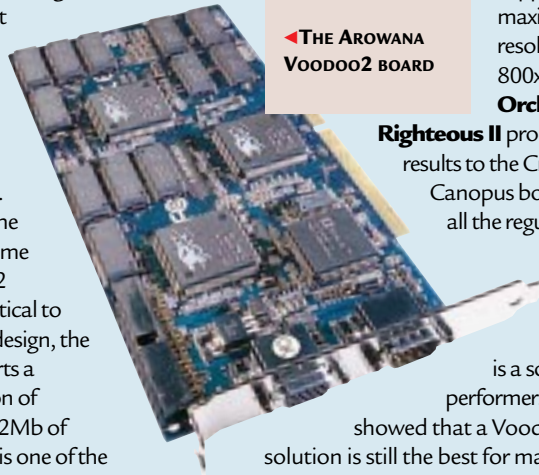
◀ **THE AROWANA VOODOO2 BOARD**

supports a maximum resolution of 800x600. The **Orchid Righteous II** produced similar results to the Creative and Canopus boards. With all the regular features of a Voodoo2 card, the Righteous II is a solid performer. Our tests showed that a Voodoo2 SLI solution is still the best for many games. Even at a higher resolution of 1024x768, the SLI mode offers a performance increase between 30 and 60 percent, giving performance scores of 169fps in Forsaken and 174fps in Incoming.

Wicked Vision

How one company is taking 3D into another dimension.

At a time when every graphics-card manufacturer is promising a "true 3D" experience, it is difficult to identify a product that gives a truly special experience. Wicked 3D is one company that is attempting to break the mould. Its technology, Wicked Vision, unlike regular "3D", provides true holographic images.

Attempts to produce holographic images on-screen are nothing new. Previous failed attempts included cheesy red and blue spectacles or clumsy polaroid goggles. Wicked Vision is different in many respects. To begin with, unlike previous attempts, it does not need software to be specifically written for it. This removes a major hurdle to its acceptance. As it is an API-level implementation of holographic imaging, any game that is written for APIs like DirectX, OpenGL or Glide is instantly transformed into a true holographic one.

Currently, over 100 games, including hitss like Quake, Unreal and Incoming, can be played using Wicked Vision.

Wicked Vision does require extra hardware. In addition to the Wicked 3D Voodoo2 board, the kit includes a pair of wireless LCD glasses and a transmitter which sits on top of the monitor. When not in use, the transmitter, which kicks in when the game is launched, allows the signal to pass through into the monitor. The spectacles are made of LCD shutters which flicker at a set rate. The rate of flicker is slightly different for each eye. The holographic images are a result of the brain's ability to merge these separate signals into one, creating the illusion of depth. Wicked claims that games are being developed specifically for this process, which would allow objects to come out of the screen as in an Imax movie.

Wicked 3D drivers are still in a rudimentary state, so some games might be distorted and text blurred. However, the technology holds immense promise.

◀ **THE WICKED VISION KIT INCLUDES A PAIR OF WIRELESS 3D GLASSES**

Table of features

MODEL	3DFX BANSHEE	AROWANA PV820	ATI XPERT98	CANOPUS PURE 3D II
SUPPLIER/CONTACT	N/A	ICOM INNOVATIONS	ATI	EVESHAM MICROS
telephone	n/a	0800 731 8419	01628 533115	01386 769600
Web address	www.3Dfx.com	www.arowana.com	www.atitech.com	www.total3d.com
Price inc VAT	n/a	£135.13	£69.00	£269.08
Price ex VAT	n/a	£115.00	£58.72	£229.00
PCI/AGP	AGP	PCI	AGP	PCI
RAM onboard/Max RAM	8Mb/16Mb	8Mb/8Mb	8Mb/8Mb	12Mb/12Mb
Chipset	3Dfx Banshee	3Dfx Voodoo2	Rage Pro Turbo	3Dfx Voodoo2
RAMDAC speed	250MHz	135MHz	230MHz	135MHz
TV out	No	no	No	Yes
Max res/ colours	1600x1200x4bn	800x600x65k	1600x1200x16.7m	800x600x65k
Max refresh at max res	100Hz	120Hz	75Hz	120Hz
Windows drivers	95, 98, NT4	95, 98	95, 98, NT4	95, 98

MODEL	CREATIVE 3D BLASTER	CREATIVE GRAPHICS BLASTER EXXTREME	DIAMOND STEALTH II G460	DIAMOND VIPER 550
SUPPLIER/CONTACT	CREATIVE LABS	CREATIVE LABS	DIAMOND MULTIMEDIA	DIAMOND MULTIMEDIA
telephone	01245 265 265	01245 265 265	0118 944 4400	0118 944 4400
Web address	www.creativelabs.com	www.creativelabs.com	www.diamondmm.com	www.vreativelabs.com
Price inc VAT	£229.13	£79.00	£69.00	Approx £150
Price ex VAT	£195.00	£67.23	£58.72	Approx £128
PCI/AGP	PCI	PCI	AGP	AGP
RAM onboard/Max RAM	12Mb/12Mb	4Mb/4Mb	8Mb/8Mb	8Mb/16Mb
Chipset	3Dfx Voodoo2	Permedia2	intel i740	nVidia Riva TNT
RAMDAC speed	135MHz	230MHz	203MHz	250MHz
TV out	no	no	No	No
Max res/ colours	800x600x65k	1600x1200x65k	1600x1200x16.7m	1920x1200x16.7m
Max refresh at max res	120Hz	75Hz	60Hz	85Hz
Windows drivers	95, 98	95, NT4	95, 98, NT4	95, 98, NT4

MODEL	DIAMOND VIPER V330	INTEL EXPRESS 3D	MATROX MILLENIUM G200	MATROX MYSTIQUE G200
SUPPLIER/CONTACT	DIAMOND	INTEL	MATROX	MATROX
telephone	0118 944 400	01793 431155	01753 665544	01753 665544
Web address	www.diamondmm.com	www.intel.com	www.matrox.com	www.matrox.com
Price inc VAT	£61.00	£62	£129.25	£129.25
Price ex VAT	£51.91	£52.77	£110.00	£110.00
PCI/AGP	AGP	AGP	AGP	AGP
RAM onboard/Max RAM	8Mb/8Mb	4Mb/4Mb	8Mb/16Mb	8Mb/16Mb
Chipset	Intel i740	Intel i740	G200	G200
RAMDAC speed	203Mhz	203MHz	250MHz	230MHz
TV out	No	no	No	Yes
Max res/ colours	1600 x 1200 x 256	1600X1200X256	1920x1200x16.7m	1920x1200x16.7m
Max refresh at max res	60Hz	60Hz	85Hz	85Hz
Windows drivers	95, 98, NT4	95, 98, NT4	95, 98 NT4	95, 98, NT4

MODEL	METABYTE WICKED 3D	ORCHID RIGHTEOUS 3D II	S3 SAVAGE 3D	STB VELOCITY 128
SUPPLIER/CONTACT	WATFORD ELECTRONICS	FROM HIGH STREET STORES	N/A	STB
telephone	01582 745555	n/a	n/a	01753 212 600
Web address	www.Wicked3D.com	www.orchid.com	www.s3.com	www.stb.com
Price inc VAT	£211.50	£210.33	n/a	£115.00
Price ex VAT	£180.00	£179	n/a	£94.87
PCI/AGP	PCI	PCI	AGP	AGP
RAM onboard/Max RAM	12Mb/12Mb	12Mb/12Mb	8Mb/8Mb	8Mb/8Mb
Chipset	3Dfx Voodoo 2	3Dfx Voodoo2	Savage 3D	Riva 128ZX
RAMDAC speed	135MHz	135MHz	250MHz	250MHz
TV out	No	No	Yes	No
Max res/ colours	1024x768x65k	800x600x65k	1600x1200x16.7m	1600x1200x16.7m
Max refresh at max res	85Hz	120Hz	85Hz	60Hz
Windows drivers	95, 98, NT4	95, 98	95, 98, NT4	95, 98, NT4

PCW Labs report

VNU LABS — EUROPEAN

Results for Incoming (chart)

Card	Score
3Dfx Interactive Banshee	80
ATI XPert 98	32
C.Labs Graphics Blaster	30
Diamond Viper V330	55
Diamond Viper V550	83
Diamond Stealth II	59
Intel Express 3D	49
Matrox Millenium G200	65
Matron Mystique G200	62
S3 Savage 3D	71
STB Velocity 128	45
Voodoo 2 boards	
Arowana Voodoo2 PV	107
Camopus pure 3D II	110
Creative Labs 3D blaster	102
Megabyte Wicked 3D	114
Orchid Righteous II	106

Results for Incoming

FOR REAL-WORLD TESTING, WE USED TWO OF THE LATEST 3D GAMES, INCOMING AND FORSAKEN. WE USED THE FRAME RATE COUNTER OPTIONS OF BOTH GAMES TO ASSESS PERFORMANCE. WITH INCOMING WE TESTED ALL THE CARDS AT THE DEFAULT 640X480 RESOLUTION. WE TESTED ALL THE NON-VOODOO2 CARDS WITH V-SYNC ON, AND THE VOODOO2 CARDS WITH V-SYNC OFF. OTHERWISE WE DIDN'T ALTER ANY OF THE GRAPHICS SETTINGS, TO ENSURE A LEVEL PLAYING FIELD. YOU CAN DIRECTLY COMPARE THE RESULTS FROM ONE SET OF CARDS TO ALL OF THE OTHERS IN THAT SET

Results for Final Reality

FINAL REALITY HAS TWO DISTINCT SECTIONS, WITH 2D AND 3D TESTS. THE 2D SECTION SHOWS WHAT KIND OF PERFORMANCE YOU CAN EXPECT FOR WINDOWS APPS, WHILE THE 3D TESTS USE ALL OF THE 3D FEATURES OF THE CARD IN A SERIES OF GAME-LIKE ANIMATED 3D SCENES. IT RUNS UNDER WINDOWS 95 AND DIRECTX 5 AND USES A 3D ENGINE DEVELOPED BY REMEDY. THE VISUAL-APPEARANCE FACTORS ARE WEIGHTED IN IMPORTANCE AND COMBINED WITH THE OVERALL PROCESSING SPEED TO PRODUCE AN OVERALL MARK. AGAIN, THE HIGHER THE SCORE, THE BETTER THE RESUT. FINAL REALITY CAN BE DOWNLOADED FROM WWW.VNU.CO.UK. ALL THE CARDS WERE RESTED RUNNING AT A RESOLUTION OF 1024X768, IN 16-BIT COLOUR AND AT A REFRESH RATE OF 100HZ,

Results for Final Reality (chart)

Card	Score (black)	Score (red)
3Dfx Interactive Banshee	4.26	4.43
Arowana Voodoo2 PV	4.16	4.12
ATI Xpert 98	3.8	4.03
Canopus Pure 3DII	3.85	4.01
Creative Labs Graphics	2.89	3.24
Creative Labs 3D Blaster	3.61	3.81
Diamond Viper V330	3.85	3.70
Diamond Viper V550	4.45	4.38
Diamond Stealth II G460	4.00	4.10
Intel Express 3D	4.05	4.13
Matrox Millenium G200	3.83	4.36
Matrox Mystique G200	3.72	4.22
Megabyte Wicked 3D	4.06	4.04
Orchid Righteous II	3.83	4.02
S3 Savage 3D	3.65	3.72
STB Velocity 128	3.79	4.20

Results for Forsaken (chart)

Card	Score
3Dfx Interactive Banshee	50
ATI XPert 98	28
C.Labs Graphics Blaster	Could not complete the test
Diamond Viper V330	Could not complete the test
Diamond Viper V550	56
Diamond Stealth II	28
Matrox Millenium G200	42
Matron Mystique G200	42
S3 Savage 3D	50
STB Velocity128	28
Intel Express 3D	42
Voodoo 2 boards	
Arowana Voodoo2 PV	101
Camopus pure 3D II	106
Creative Labs 3D blaster	98
Megabyte Wicked 3D	110
Orchid Righteous II	103

Results for Forsaken

AS IN THE INCOMING TEST, WE USED THE FRAME RATE COUNTER OPTION OF THE GAME TO ASSESS PERFORMANCE. TWO OF THE CARDS, THE CREATIVE LABS GRAPHICS BLASTER EXXTREME AND THE DIAMOND VIPER V330, WERE UNABLE TO RUN THE GAME AT ALL. WITH FORSAKEN WE USED THE MAXIMUM RESOLUTION THE CARDS WOULD SUPPORT, 800X600 OR 1024X768. BEAR THIS IN MIND WHEN COMPARING CARDS: OBVIOUSLY, A CARD THAT RAN THE TESTS AT 800X600 WILL LIKELY GIVE A HIGHER FRAME RATE THAN ONE WHICH RAN AT 1024X768. OF THE OTHERS TESTED, ALL EXCEPT THE INTEL EXPRESS 3D WERE ABLE TO RUN AT A RESOLUTION OF 1024X768. THE INTEL COULD ONLY MANAGE A RESOLUTION OF 800X600. THE VOODOO2 CARDS WERE RUN AT 800X600 WITH V-SYNC OFF.

group test

Editor's Choice

Diamonds are a gamer's best friend — this Viper sure does bite!

There's no doubt that the pace of development in graphics cards is of benefit to the end-user. In the days of 2D-only cards, there may have been a difference of just a few percent between the best and the worst; but with 3D applications you can really feel the benefits of the best cards. And this isn't just in speed terms, but in visual features and quality. Watching the Final Reality, Forsaken and Incoming tests, the top performers were clearly visible even before the objective compilation of the results.

With some cards there's a trade-off though, particularly the Voodoo2 variants. Their speed is superb and they support practically all 3D features, but the overall look of the images they produce is lacking a little in vibrancy; plus they're very expensive, for 3D-only units. It looks as if 2D/3D combo cards really are the way to go, unless you've got around £500 to spare and need the ultimate games acceleration with twin Voodoo2s. Even 3Dfx has admitted that the dominance of 3D-only cards may be coming to an end, with its superb Banshee chipset. This, along with S3's Savage and Matrox's G200, has proved that the technology is now good enough to give superb 2D and 3D performance on one card with few, if any, compromises. Of course, you could argue that the pace of development means that these cards will soon be obsolete. There's no getting around that, but if you buy one of our winners, you'll probably be so pleased, it won't bother you.

Given the high price and 3D-only limitations of the Voodoo2 cards, we felt that Editor's Choice had to go to a 2D/3D combo card. Although the 3Dfx Banshee put in a storming performance, the unit was a sample and not eligible for an award. But look out for it when the major manufacturers start shipping the chipset on their products. However, it was clear which card *should* win our coveted **Editor's Choice** award – the **Diamond Viper V550** trounces all other 2D/3D cards in terms of speed, even with the beta drivers supplied to us for the review.

If you really want the highest performance for games and don't want to use the card for desktop 3D, then a Voodoo2 is still the best performer. Top of the heap was the **Wicked 3D** from **MetaByte**. It's not cheap, but it was the fastest and most fully featured, plus there's the Wicked Vision add-on.

Consequently, we gave it a **Highly Commended** award. The second Highly Commended goes to the **Matrox Millenium G200**. Performance in both 2D and 3D is nothing short of superb, it's fully AGP 2x compliant, and it has OpenGL drivers for both Windows 95/98 and NT. On top of that, its visual quality is the best of the bunch.

EDITOR'S CHOICE

PERSONAL COMPUTER WORLD
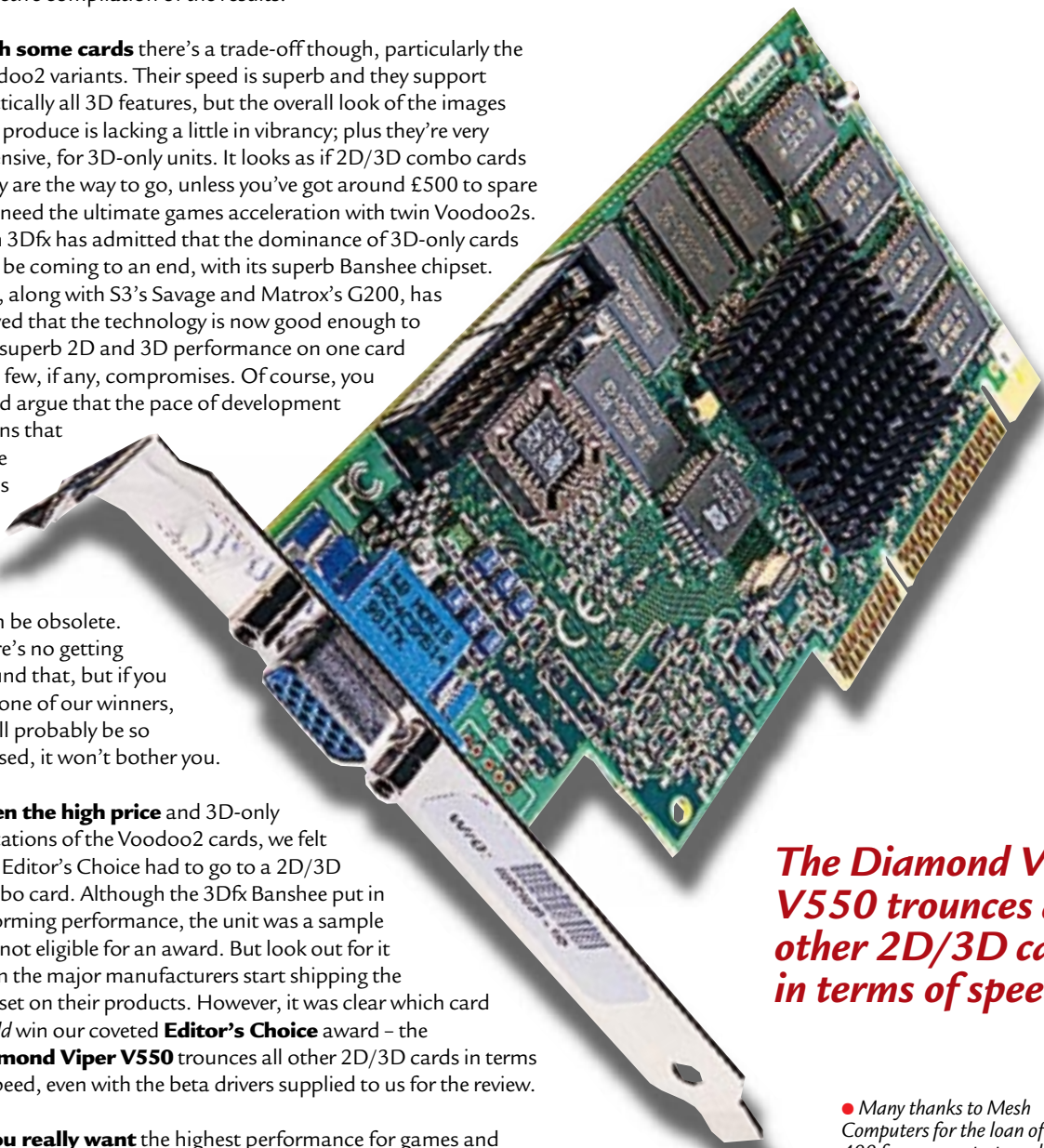
The Diamond Viper V550 trounces all other 2D/3D cards in terms of speed

● *Many thanks to Mesh Computers for the loan of a PII 400 for use as a test machine.*
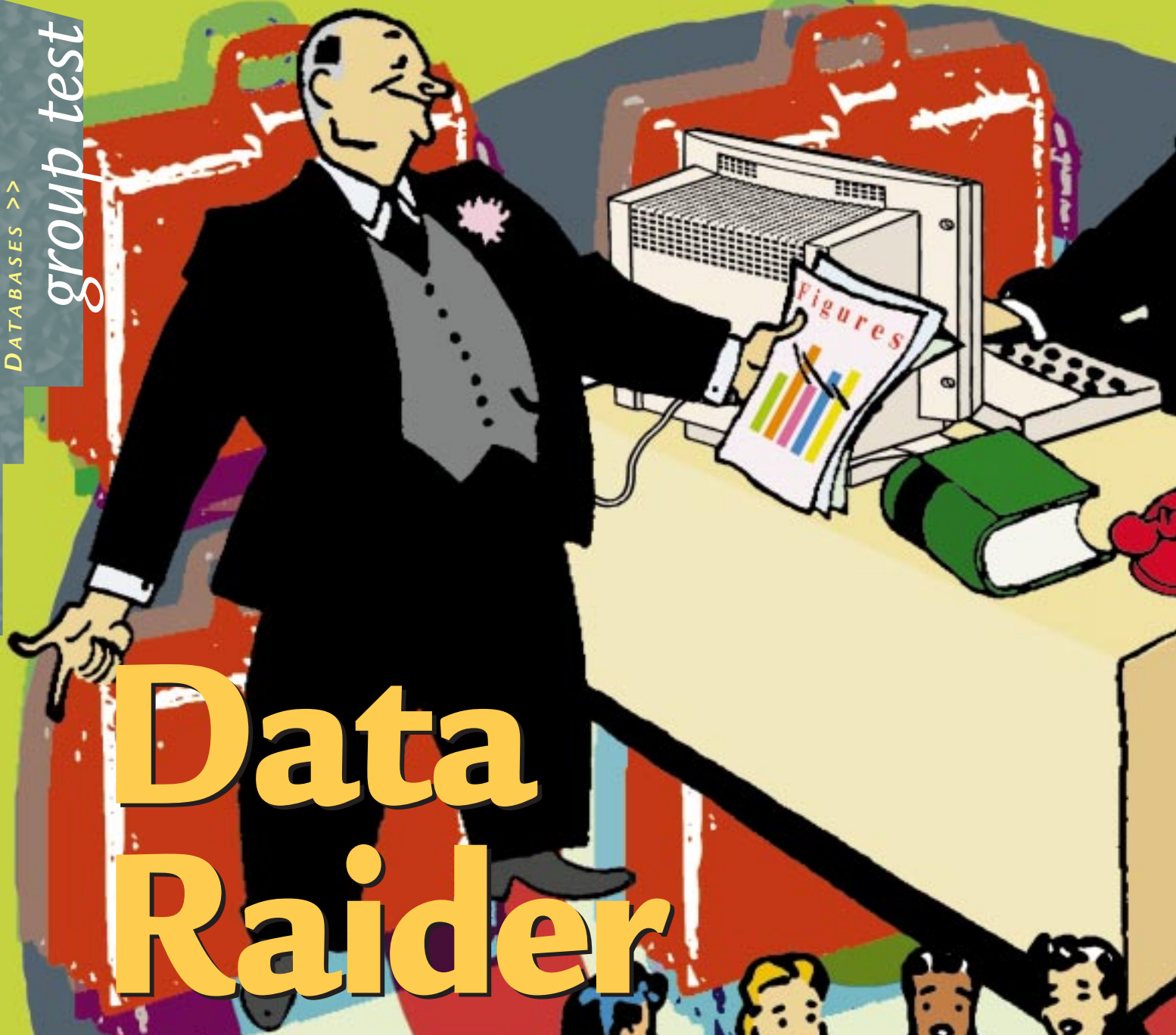
Data Raider

raw data

Figures

STATISTIC

What's the best data manager for your needs? Tim Anderson gets to grips with the leading contenders in the Windows database market.

Everyone needs to manage data, whether it is an address book, a CD collection, or the invoices, stock and order records that are essential to running a business. Even entry-level PCs can handle huge amounts of data but choosing the right software to manage it is tricky. This group test looks at the main contenders in the Windows database market. It is an area dominated by Microsoft Access, thanks to the commanding market share of Office.

The database world is changing, though, and the use of all-purpose Windows databases is diminishing. A typical PC will access addresses and contact information through a PIM (personal information manager), a contact manager, or a Groupware product like Lotus Notes, Novell GroupWise or Microsoft Exchange. Corporate data is likely to be on a server running software from the likes of IBM and Oracle. For both home and business users, sharing data on the web has become important, using both the internet and local intranets. The ability to connect to diverse sources of data and to share your own data with others, is more important than ever. All this means that today's database manager must be truly flexible; able to operate in the old way as an all-in-one solution, or to fit in as a component in a wider data-management strategy.

We have looked at all the aspects, including form design, programmability, integration with other applications such as word processors and spreadsheets, and web features. Ease of use is another factor, particularly as relational database managers are notoriously difficult for novice users. The packages vary in how far you can get without programming, which is an important point for those who, reasonably enough, do not want to become IT specialists merely to manage their club's membership records. The key is to find the right match between the task, the tools, and the skills available.

Contents

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Illustration by Paul Shorrock

Corel Paradox

A new level of sophistication for a familiar and flexible database.

It is hard to think of Paradox as a Corel application. For most of its life, Paradox belonged to Borland, which produced both DOS and Windows versions. Strictly, it is now a joint venture, with Inprise remaining responsible for the database engine and Corel handling other development aspects. That means Paradox uses the Borland Database Engine (BDE) also found in Visual dBase and other Inprise products. The advantage for Corel is that it provides a high-end database for the Professional version of WordPerfect suite.

Paradox is close to Microsoft Access in its aims. It is intended for end-users and developers, and to work either as a standalone database manager or as a client for server databases. There are also links to other WordPerfect suite applications and a range of web features to enable both static and dynamic internet publishing. This is a huge scope and makes Paradox an ambitious and sophisticated product. The BDE is more than adequate to drive Paradox so the key question is how successfully it balances the requirements of developers and database novices.

The answer is that Paradox scores highly on flexibility and power but is bewildering for novices. A typical Office suite user might choose File/New to
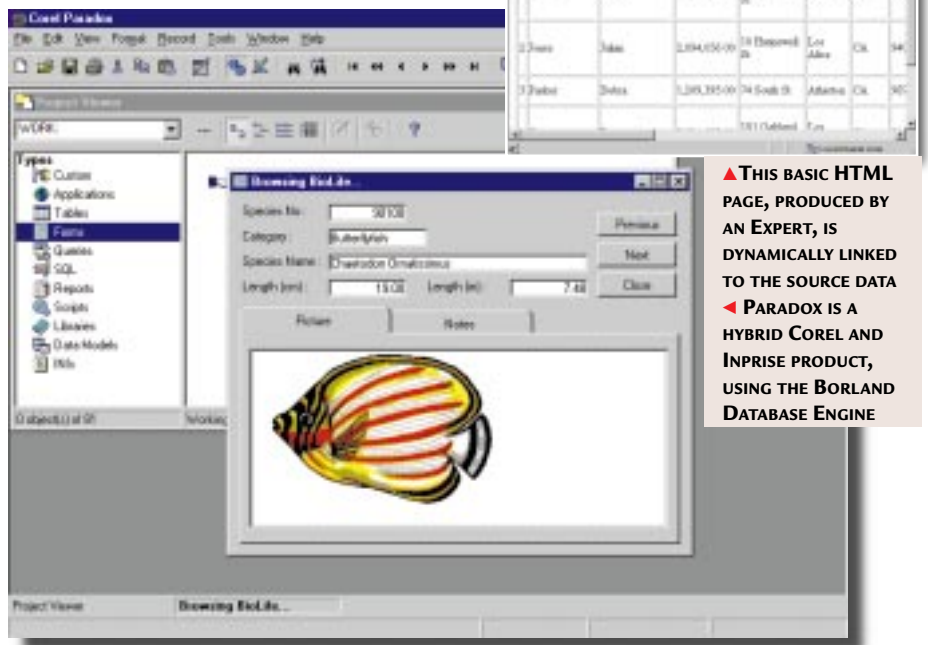
▲THIS BASIC HTML PAGE, PRODUCED BY AN EXPERT, IS DYNAMICALLY LINKED TO THE SOURCE DATA
◄ PARADOX IS A HYBRID COREL AND INPRISE PRODUCT, USING THE BORLAND DATABASE ENGINE

create a new database. Paradox offers a perplexing range of options, beginning with Data Model, Form, Library and Query. Scrolling down to Table makes a good choice and a Table Expert kicks in with a range of templates for both personal and business use. Paradox opens the table in a grid view ready for data entry and a Form Expert will create a record-by-record layout. You would expect the Table Structure option on the View menu to let you add a field but in fact you need the Restructure option on the Utilities submenu of the Tools menu. Each field can have one of 17 field types, and to add a new field you need to click on an existing one and press Insert — hardly intuitive.

Paradox makes a poor choice for bundling in an Office suite but as a high-end developers' database manager it looks much better. The Paradox native data format is fully-featured, with enforced referential integrity, encryption, security and table-level validation. The form designer is sophisticated and the ObjectPal scripting language well suited to most data management and processing tasks. New in Paradox 8 is a range of web publishing options, the most interesting being the integrated Corel Web Server. While it lacks the

simplicity of FileMaker's instant web publishing, it is easier to work with in that the web server lets you add your own web pages alongside those generated by Paradox to handle data access. As part of a corporate intranet, Paradox could provide dynamic database access with relatively little pain.

A problem for Paradox is that database developers have many other options available to them and, while powerful, the ObjectPal language is unique to Paradox and less useful in other contexts than standards like Java. This means Paradox is unlikely to have a bright future, even in the development world.

CASE STUDY
Paradox

"Paradox serves my needs as an interactive tool for industry-standard dBase files as well as the more flexible and powerful Paradox files. Its Query by Example is very powerful. The ability to build referential integrity and other restraints into the table design means that these restraints always apply. You can get pretty far without writing any code and you only need to add code to modify the default behaviour. The report generator is very powerful but I miss the ability to visually highlight multiple rows of a table and cut, copy and paste. Also, if you have a 10,000-record table and want to split it into two 5,000 record tables, you have to write code to do it."

BILL SPARROW

PCW DETAILS

★★★

Price *£76.38(£65 ex VAT)*
Contact *Corel 0800 973189*
www.corel.com
System Requirements *Window 95 or NT 4.0, 16Mb RAM*
Good Points *Powerful and flexible. Easy web publishing. Strong connectivity through the Borland Database Engine.*
Bad Points *Too complex for novices. Proprietary programming language. Confusing interface.*
Conclusion *Needs a lot of work to match Access in usability.*

FileMaker Pro

Cross-platform use and simplicity from a common-sense database manager.

If you want to share data with Apple Macintosh users, FileMaker is the clear choice. It originated on the Mac but is available in a Windows version. The two have closely-matched features and mixed Windows-Mac applications work well. FileMaker has the feel of a Mac application and has been designed with usability as its top priority.

To create a FileMaker database, you can choose a template or start from scratch. You choose your fields from a list that includes text, number, date and calculation fields. You are not required to state what sort of numbers you want to store, how long a text field may be, or what indexes you require. Text fields can be up to 64,000 characters so there is no distinction between a character and a memo field. Indexing is automatic and FileMaker indexes each word in a text field. You can specify options like pop-up lists of values, and the ability to look-up data from another file.

CASE STUDY
FileMaker Pro

"I've been using FileMaker for various things since Version 2. We're currently running a mixed ten-user network of Macs and Windows 95 accessing a copy of NT Server. The reason we first got into FileMaker Pro is that it is so easy to knock together whatever we need to do. It saves us a lot of time. We use it for all manner of bits and pieces, from contacts files (but with built-in passing of messages about incoming calls, creating/faxing/filing of correspondence and so on) through to a mini mail order system. Its ease of use can be something of a double-edged sword, though. It's easy to underestimate just how much you can do with Filemaker because the approach is so simple. People who prefer command lines will assume that it can't do things when in fact it can. We could do with TAPI compliance to use with the phone cards in the PCs, the ability to copy scripts between files and some way of using it directly with our main accounts system, Access Accounting. That last point is supposed to be addressed with 4.1 and ODBC."

**TIM LEIGHTON-BOYCE,
NEW DEAL SKATES UK**

Once you have defined fields, they appear on a form, called a layout. You can then add drawing objects, specify formatting and add buttons. To create a new form you add a second layout. Query-by-form is automatically included, providing an intuitive way to find records. Buttons are linked either to built-in actions, or to scripts created using a ScriptMaker tool. FileMaker now allows you to set up relationships and to include linked data on a layout. Reports and mail merge are layouts in FileMaker, with tools available from the tool panel.

FileMaker has a built-in web server. To publish a database to the internet you check the Web Companion plug-in and choose an option on the sharing dialog for the database. Browsers can then navigate to the web address of the machine where FileMaker is located and see the layouts appear in slightly simplified form in their browser. Java is used for parts of the online layout. You can customise the design of the web view but it leads you into a mire of technical scripting that is best avoided.

You would expect FileMaker's design options to be limiting but it is so well thought out that mildly sophisticated solutions can be created and even large databases perform well. It is a better

product than Lotus Approach, its closest equivalent. Developer and server versions are available, the latter giving better performance on a network. FileMaker's weak point is that it cannot communicate easily with other applications. To mail-merge from Word, you would have to export the data to a format Word could understand. FileMaker Pro 4.1, currently in late beta, adds support for ODBC but only for import. There is no way to insert or update data in the ODBC data source and still no ODBC driver to allow other applications to read a FileMaker database. It is time FileMaker became a proper Windows citizen.

PCW DETAILS

★★★★

Price *£198.58 (£169 ex VAT)*
Contact *FileMaker 0845 6039100*
www.filemaker.co.uk
System Requirements *Windows 3.1 or higher, 8Mb RAM. Web features need Windows 95, 98 or NT.*
Good Points *Ease of use. Cross-platform with the Mac. Instant web publishing.*
Bad Points *Cannot read FileMaker data from other applications. Web publishing is difficult to enhance. No easy route up, once the limits have been reached.*
Conclusion *It lives in its own world, but this is the best database manager for non-specialists.*

Inprise Visual dBase 7.01

Powerful and elegant, this is a database for the developer.

When you purchase Visual dBase you are buying into a family of Inprise products. At the core is the Borland Database Engine (BDE), shared by dBase, Delphi and Corel Paradox, and is also used as an add-on to the JBuilder Java product. Its closest equivalent is Microsoft's JET database engine, found in Access, Visual Basic and Microsoft Office, although Visual FoxPro does not use JET. The BDE has three elements. It is able to manage dBase and Paradox data through built-in drivers. Via the SQL Links add-on, you can also install native drivers for server databases such as Oracle. At last, you can access data through ODBC drivers. A database administrator lets you set up data sources that can be used from any other BDE application.

To get the best from the BDE it pays to use native drivers. There is a driver for Microsoft Access but this relies on JET already being installed and does not support all the features of Access databases. Like Microsoft, Inprise has extended the .DBF file format and made it incompatible with previous versions and incompatible with FoxPro, too, so sharing dBase data needs care. Inprise has recently announced the future direction of Visual dBase which is to be as a front-end tool for InterBase, the Inprise client-server database manager.

The dBase interface has several parts. The Navigator gives you a dBase-orientated view of a directory on your hard disk. The Project Explorer organises forms, reports, database tables and other elements into a unified project and the Command window gives a command-line interface to dBase as if you were still working in DOS. Each element, such as a form or report, has its own designer and there is a colour-coded source code editor and a full-featured debugger for checking your code. To use dBase, you might start by creating a new project. The project explorer then lets you add elements to it, for example, adding database tables, forms and reports. A tree view on the left shows all the parts of the project while a window on the right lets you view the current item. A right-click lets you open the item in its designer.

An interesting aspect of Visual dBase is the two-way tools. You can open a form or report either in a visual designer or as dBase code and switch seamlessly between the two. The language is fully object-oriented, although somewhat simplified in comparison to Java or C++. A great feature is its ability to create custom components, usually based on an existing dBase object. These can then be installed on a component palette for use in future projects. You can also use ActiveX controls. A web wizard lets you publish data to the web, either as a static report or by using CGI (see *Putting Data on the Web*, p227) to call into a Visual

▲**THE VISUAL dBASE PROJECT EXPLORER IS A QUICK WAY TO NAVIGATE, VIEW AND EDIT PROJECT ELEMENTS**

dBase application. Despite the wizard, this is not instant publishing but requires considerable coding effort.

Visual dBase versus Visual FoxPro is a hard call. VdBase has a tidier and more responsive interface. It is a little lighter on system resources and benefits from two-way editing, encryption of DBF tables and support for Paradox data. Visual FoxPro has much stronger COM features, better ODBC support, and its dedicated .DBF database engine remains exceptionally fast. The truth is that developers using either product are unlikely to switch now.

CASE STUDY
Visual dBase

*"**Visual dBase** is a serious programmer's tool. It will work equally with traditional desktop DBF and DB tables, and many client/server SQL systems. I use it as the interface to a server-hosted 600Mb multi-table InterBase database of technical information and it is nowhere near its limit. However, Visual dBase is still capable of producing a simple desktop application to manage the Xmas card list. There are no additional payments to distribute compiled executables. I do wish that the visual tools could be a little more tolerant of my programming errors. But nevertheless, when I clean up the code it is solid as a rock."*

PAUL FRANKS

PCW DETAILS

★★★★

Price *£292.58 (£249 ex VAT)*
Contact *Inprise 0118 932 0022*
www.inprise.com
System Requirements *Windows 95 or NT, 12Mb RAM.*
Good Points *Elegant, responsive interface. BDE gives database independence. Custom components promote code reuse.*
Bad Points *Yet another version of the .DBF standard. Weak COM support. Still requires a runtime library.*
Conclusion *For developers only, but this is the best dBase yet.*

Lotus Approach 9

Combines power and user-friendliness in a good value program.

Lotus has given Approach a SmartSuite look-and-feel and added the LotusScript programming language but fundamentally it has not greatly changed. There are very few updates in SmartSuite Millenium, suggesting that Lotus is not investing much development in Approach at present. From the user's perspective, Approach looks like a single, large tabbed dialog. Instead of forms and reports appearing in separate windows, they each have a tab, making it easy to navigate. A toolbar has four key buttons — Browse, for viewing and editing the data; Design, for editing the current form or creating a new one (all the usual tools are available); New record; and Find, which lets you do a query-by-form: with this type of query, you enter values or wild-cards into the current form and Approach will find all the records which match those values. Even form letters, for performing a mail merge, appear as just another tab. It is all nice and easy and works well provided that the database is not too ambitious. Creating a database is simple, too. By default the format used is .DBF, compatible with dBase IV. You enter field definitions in a dialog, with options including validation formulae, serial number fields, default values and more. You can join tables using a graphical dialog but at this point you need to know a bit about relational databases. There are a few application templates and quite a number of table templates, the latter being less useful since they do not set up joins, which are the hardest part of database design.

A clever thing about Approach is that although it works with standard .DBF tables, these have extra features when used with the program, thanks to a container file with an .APR extension. Provided that you only access the data through this file, all the extra features

work. There is also an SQL assistant, a series of dialogs to help define a query on a server database through a PowerKey or ODBC, including a driver for Lotus Notes. For web data sharing, you can print from Approach as a jDoc to render the data in Java, but there is no easy way to publish dynamic data. Approach possesses a good combination of power and user-friendliness but there are problems. This makes it hard to recommend it for major projects. The tabbed interface is inflexible and limits you to only one way of implementing a database front-end. Some operations cause the form contents to flash as the screen is updated.

There are extensive ActiveX features, but there were several crashes when trying to insert controls onto a form. It looks as if Lotus intended to add the ability to host JavaBeans on an Approach form, as there is an intriguing reference to this in online help but it has not yet been implemented.

PCW DETAILS

★★★

Price *£45.83 (£39 ex VAT)*
Contact *Lotus 01784 455 445*
www.lotus.co.uk
System Requirements *Windows 95 or NT, 16Mb RAM.*
Good Points *Uses standard file formats. Easy, tabbed, interface. Adds strong features to .dbf tables.*
Bad Points *Inflexible design. Proprietary index format. Screen flashes during updates.*
Conclusion *Good value, but not suitable for advanced projects.*

Microsoft Access 97

A complex product that still turns beginners into wizards.

The basic design of Access has not changed since it was first released in 1992. It is an elegant design that has worn well. It uses a database container, a single file that stores not only your data but also the forms, reports and program code that enables you to make use of the data. There is a tab for tables, queries, forms, reports, macros and modules. To create a new element, you first select the tab, then click the New button. For existing elements you can choose Open or Design. Another important feature is the numerous wizards. For example, if you choose to create a new form, you are offered a choice of wizards to create a form automatically based on your chosen options. There is a range of templates for common database tables such as customers, products and expenses, or for personal tables like recipes, plants, books and photographs.

Access was designed to use SQL, and the product mimics the features of a server database. For example, you can define users and groups and set permissions at various levels. It is nevertheless a file-sharing database (see *Database Tiers,* p227) and not suited to use on large networks. You can overcome this limitation by connecting to a server database through ODBC. There is rich support for developers, with Visual Basic for Applications built in and a runtime version available for licence-free distribution.

▲ THIS TYPICAL ACCESS DATABASE, CREATED WITH A WIZARD, USES A SWITCHBOARD FORM AS A MENU TO REACH OTHER FORMS AND REPORTS

This is a highly complex product that hides its difficulty behind an array of wizards and tools that allow novices to achieve a lot without programming. It should come with a health warning that if you do run into problems there is a mountain of learning to do before you will be able to solve them. Links to the rest of Office are good and the native .MDB data format is widely used by other applications. The query builder is superb and lets you switch seamlessly between SQL code and a visual designer.

The main problems with Access, complexity aside, are the several different and incompatible versions of the MDB data format and the fact that the default application style, based on a switchboard form giving access to multiple overlapping windows of data, is neither the best nor the easiest to use. In skilled hands, both these issues can be overcome. This is a powerful and complete product that has won its market share on quality, not just by virtue of being within Office.

What's new in Access 2000? The forthcoming Access is fully integrated with SQL Server. You have always been able to attach SQL tables to an Access database, but Access 2000 connects via OLE DB without using JET, its internal database engine. Access also has new tools to manage SQL Server databases, and a cut-down SQL Server will come in the box . Another major new feature is the ability to create and edit Data Access Pages — essentially an HTML version of an Access form. This makes it easy to put live data connections on a corporate intranet. Data Access Pages use ActiveX controls, so this is mainly a technology for Internet Explorer and intranets rather than the worldwide web.

CASE STUDY
Access 97

"**Access provides** *a user-friendly but powerful development environment for rapid prototyping. I like the data-bound objects such as list controls, graphs, forms and reports, the query grid which makes it possible to easily design and manage very complex queries, and the handling of external data sources as if they were native. Support for OCX components is a tad flaky and I would like VBA language extensions to handle printing, email and common dialog issues. At the moment, Windows API functions have to be used.*"

MUSA KHAN
MANAGEMENT CONSULTANT

PCW DETAILS

★★★★★

Price *£351.32 (£299 ex VAT), or bundled with Microsoft Office Professional.*
Contact *Microsoft 0345 002000*
www.eu.microsoft.com
System Requirements *Windows 95 or NT, 16Mb RAM.*
Good Points *Beginners can get real work done with Access. Lots of advanced features. Developer edition provides free runtime licence.*
Bad Points *A complex product. Bewildering once it runs out of wizards. Depends on COM, which can cause strange errors. Default applications are awkward to use.*
Conclusion *An ambitious product that appeals to a range of people, from novice to expert.*

Microsoft Visual FoxPro 6.0 l

Fast data handling and a powerful tool in the right hands.

Since version 5.0, FoxPro has been bundled with Visual Studio as a developer product. There are wizards for creating tables, building queries, forms and reports, and mail-merge to Word, but FoxPro is not designed as an interactive tool. Its aim is to create applications, custom solutions that can be used by others who may not even realise they are using FoxPro. To work with FoxPro, you begin by defining a database. Once tables and fields are defined, you can create database forms. The form designer provides a rich set of tools including ActiveX controls if required. Everything is programmable, so you can add custom code for hundreds of different events, such as button clicks or keystrokes. To bring all your forms and code together, there is a project manager that lets you easily navigate between project elements and add new ones, such as reports and menus. When you are done, you can build the project into an application that runs within FoxPro or standalone with a runtime library.

The universality of FoxPro is compromised because Microsoft has extended the format, adding a container file. This gives features like table-level
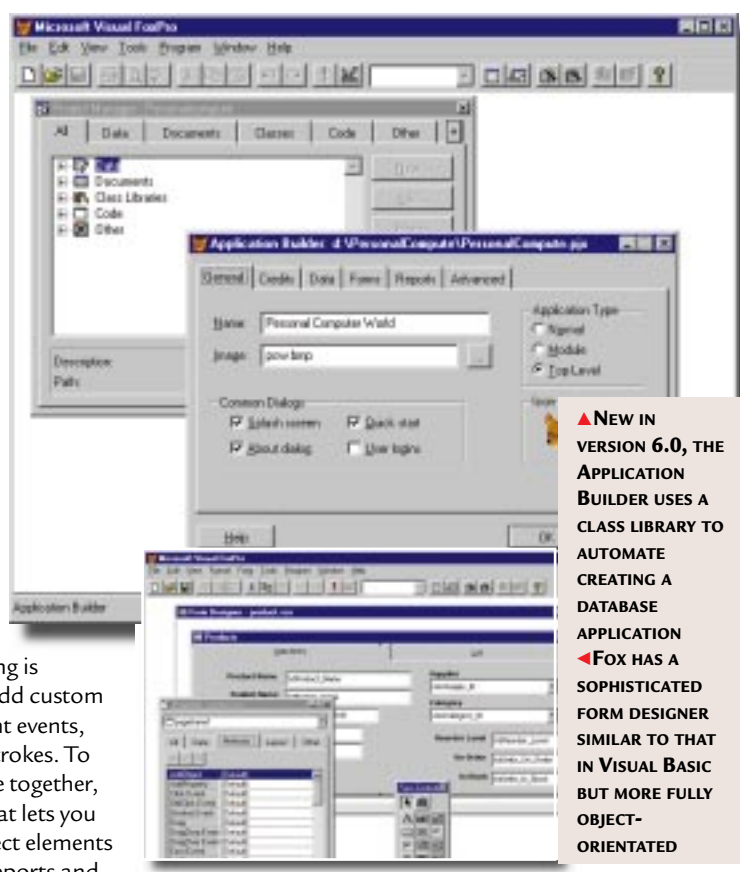
▲NEW IN VERSION **6.0**, THE APPLICATION BUILDER USES A CLASS LIBRARY TO AUTOMATE CREATING A DATABASE APPLICATION ◄FOX HAS A SOPHISTICATED FORM DESIGNER SIMILAR TO THAT IN VISUAL BASIC BUT MORE FULLY OBJECT-ORIENTATED

The result is that Fox developers will continue to do great things...

validation, enforced referential integrity, and triggers, code that executes automatically when records are inserted. Only FoxPro can properly read this extended data format, although an ODBC driver is provided. Alternatively, you can still work with old-style data. The original dBase language has also been greatly extended and is now unique to FoxPro, including full object orientation. Developers can save time by building up a library of reusable FoxPro objects. FoxPro also works well with remote data, and you can easily migrate from native FoxPro format to a client-server setup.

New features in version 6.0 of FoxPro include a class library called an application framework, along with an application wizard to get you started.

The language itself has been improved, and a component gallery makes it easier to manage and reuse objects and ActiveX controls. For web publishing, you can either use a wizard to generate static data, or build a FoxPro database server to be called from a web page to deliver dynamic data. You can also create Active Documents, forms that can run inside Internet Explorer like an ActiveX control.

FoxPro has no lack of power, but there are some irritations. The report writer and menu designer have not been properly brought into the object model. The language has no strong typing and no equivalent to Visual Basic's Option Explicit, which can cause errors. What is harder to fix is the steep learning curve, the huge runtime library, and the fact that FoxPro falls between the interactive products like Access and tighter developer tools like Delphi, PowerBuilder or even Visual Basic. The result is that Fox developers will continue to do great things with their chosen tool, and wonder why no-one else bothers.

CASE STUDY
Visual FoxPro

*"**I grew up on** previous versions of Fox. Developers prefer the Object Orientated Programming capabilities of FoxPro — Visual Basic doesn't have inheritance — as well as the fast data handling. The ability to use SQL to build an updatable view has opened up many new vistas. Most developers build or acquire a framework that allows projects to be completed in a fraction of the time that structured programs took. I'd like to see faster screen handling and a better editor."*

GERRY HUGHES

PCW DETAILS

★★★★

Price *£468.83 (£399 ex VAT)*
Contact *Microsoft 0345 002000*
www.eu.microsoft.com
System Requirements *Windows 95 or NT, 16Mb RAM.*
Good Points *Fast data processing. Powerful object model and language. Good connectivity to server data.*
Bad Points *Steep learning curve. Unique data format and language. Huge runtime library.*
Conclusion *Not for beginners, but performs well in expert hands.*

Exploring other options

The big boys aren't the only ones producing usable database software.

The number of products in the Windows database market has if anything diminished over the last few years, with smaller vendors finding it tough to keep up with the industry giants, particularly with the dominance of Microsoft's Office suite. Nevertheless, there are still other options.

Superbase 3.5

Superbase 3.5 is the latest version of a famous British database manager which, in the days of the Atari ST, was the best around. After changing hands several times it is now in the hands of its own developers, who have just released version 3.5. This runs on 16-bit Windows, and the new version supports HTML export, the Euro symbol, and improved forms with split windows and the fashionable flat-look toolbars. Superbase is positioned as a developer's database, but its most important market is upgrades from its existing base of

▲**Superbase is targeted at developers, but there is no support for ActiveX controls**

users. Future plans include a cross-platform version. The strength of Superbase is that it is lightweight, running well on modest hardware, and handles image libraries well. On the downside, it lacks polish, and needs a proper version for Windows 95 and NT if it is to attract new customers.

DataEase

Windows snarled up DataEase, particularly as the company could not agree with its main worldwide distributors on whether to port the DOS version with DQL (DataEase Query Language) or create a new client-server system. In the end both were done, but

too late to take a major slice of the Windows market. The products are still available and include DataEase 5.0, a 16-bit product with DQL compatibility, and DataEase Net Plus, which has developed into an interesting database-independent application builder with internet deployment options. There are

▲**Still going: DataEase 5.13 is a 16-bit product supporting the old SQL query language**

migration tools for existing DataEase DOS applications, but the upgrade path is not a smooth one.

Alpha 5

This is a product aimed at the middle ground, being better suited to developers than end-users, but easier to use than the high-end database products. A nice feature is an RTF field type, allowing you to store formatted text in a standard compatible with the Windows clipboard. This is not a fully up-to-date product though, and lacks support for ActiveX controls,

▲**Alpha Five version 3 is aimed at the middle ground, between end-user and high-end developer tools**

ActiveX automation, and ODBC. A new version 4.0 is coming shortly, but was not available in time to be evaluated for this survey.

Specialist database tools

While the focus of this feature is on all-purpose database managers, there are many more specialist products that may fit a specific need better. For example, if it is contact details you are storing, there are a range of contact managers such as ACT, Goldmine or Tracker which have built-in features for handling contact history, reminders, meeting schedules and more. PIMs like Organizer and Outlook are ideal as everyday address books, and each of these can be linked to a back-end data store such as Lotus Notes or Microsoft Exchange as a corporate tool for managing messages, contacts and schedules. If it is accounting information, Sage, Quicken or Microsoft Money will be a better investment than trying to build your own system in Access or FileMaker. For managing free-form text or other
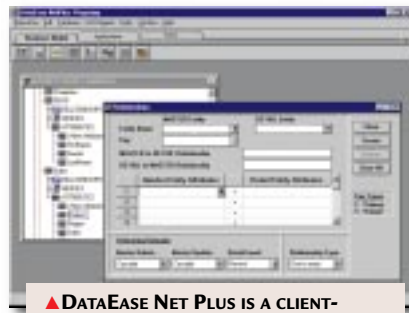
▲**DataEase Net Plus is a client-server design tool which connects to any ODBC data source**

unstructured information, a system like AskSam, from AskSam Systems, is tailor-made for the job.

PCW DETAILS

Superbase 3.5
Price *£387.75 (£330 ex VAT)*
Contact *SuperBase Developers 01223 365550* **www.superbase.com**
DataEase 5/Net Plus
Price *DataEase 5 £346.63 (£295 ex VAT); DataEase Net Plus £2291.25 (£1950 ex VAT)*
Contact *Sapphire 0171 539 0800* **www.dataease.co.uk**
Alpha 5 v 3
Price *£117.44 (£99.95 ex VAT)*
Contact *Alpha Software 01752 897100* **www.alphasoftware.com**

Putting data on the web

Undoubtedly a good idea; here's how to go about it.

There are at least four good reasons for publishing data to the web. First, it publishes information to the widest possible audience. Second, it enables access to data from different computer platforms. Third, it centralises the database application so that you can fix bugs and update the program logic on the server. And fourth, everyone uses web browsers so you will have less training to do. Great idea, then; but how easy it is in practice depends on several factors. If you only have a dial-up connection and want to put data on your web site, you are limited to publishing static data. This works for smaller databases, and can be kept up-to-date by automating the export and upload process. The data will be read-only, and publishing large databases this way is not practical.

Dynamic database publishing lets users log-in, query and update live data. FileMaker Pro and Paradox achieve this by having a built-in web server. It is very effective for simple data access, but less useful when you want to integrate the data with a large, content-rich site.

There are alternatives like CGI (Common Gateway Scripts), Microsoft's Active Server Pages, or having a Java applet accessing data through JDBC (Java Database Connectivity). Check out tools to simplify developing these solutions like Microsoft's Visual InterDev, Allaire's Cold Fusion, haht software's hahtsite, and tools from Sybase and Inprise.

Database tiers

There's more than one way to construct a database system.

Even with simple systems, it helps to think of a database system as containing at least three elements:
☞ **the front-end** or client, with all the required forms, fields and menu options;
☞ **the database engine**, which does the work of querying the database and feeding back results to the client;.and
☞ **the data itself**, stored on disk in a format that the engine understands. A simple Access network would have the data on one machine, while each workstation ran its own copy of Access, reading the data across the network. This is called **file sharing**. There are several snags with this setup. Each workstation has to be powerful enough to run Access, lots of data has to be transferred across the network, and any change to the application means updating all the workstations individually. With a client-server system, the database engine is moved to the server. Network traffic is reduced, since only the results of queries need to be transferred. Client-server systems can support many more users than file-sharing applications.

The next step is to insert another tier into the system. The "middle tier" contains the logic of a database application. The client can now be very simple indeed and work well even over dial-up links. **Multi-tier systems** are more flexible and powerful, but more complex to develop.

The jargon, explained

When a record is really an entity. Or is it a row?

Database vendors have spread a lot of confusion by using different words to describe the same things. In this group test we have used the same basic terminology throughout to make it easier to compare products.
☞ **A record** is a reference to one item in a table, for example a customer in a customer table. Records are sometimes called rows, because they are similar to rows in a spreadsheet table, or entities.
☞ **A field** is a single piece of information about a record. Fields are sometimes called properties or attributes.
☞ **A table** is a collection of records.
☞ **A database** is a collection of tables. For example, an order processing database might contain tables for orders, products and customers. Unfortunately Ashton-Tate, creator of dBase, called tables databases. Some products, including the current Lotus Approach, still do.
☞ **A query** specifies certain criteria with which you want to search the database. Queries can span more than one table. The results of a query look like a temporary table, and may be read-only or read-write. These results are sometimes called views, cursors, result sets, or recordsets.
☞ **SQL** stands for Structured Query Language. It is an industry-standard way of defining queries, and also sending commands to databases to create tables or delete records.
☞ **ODBC** stands for Open Database Connectivity. It lets applications query any database for which there is an ODBC driver. These are available for most databases, although the quality of drivers is variable.

Editor's Choice

Mature software that is the best all-round choice.

All the main products in this group test have been around for at least five years, and in some cases twice that long. In some respects the Windows database market looks tired, with few vendors wanting to take on Microsoft on its home ground, and putting their energy into cross-platform distributed database technology instead. This is mature software, and each one is more than able to deal with everyday data management. The most striking differences are in the area of ease of use, particularly for non-specialists, integration with other applications, and the ability to scale up to client-server or multi-tier systems accessible from the web or across different platforms.

The outstanding product in the group is **Microsoft Access**, and so is our **Editor's Choice**. It is approachable for beginners, and will scale a long way

before running out of steam. The wizards are comprehensive, it has an outstanding query builder and good Office integration, and there are routes to client-server, web deployment, and distributed applications. But even Access has its dark side, and the industry has not yet produced a relational database that is easy and safe for novices. Nevertheless, this is the best all-round choice.

If ease of use is the priority, **FileMaker Pro** is **Highly Commended**. It succeeds in avoiding database jargon and providing a solid, understandable tool for data management. It offers instant web deployment which is fantastic if it

meets your needs as-is, but is hard to extend and customise. FileMaker's weak point is poor integration with Windows. Visual dBase, Visual FoxPro and Paradox are better suited to developers than end-users. Visual dBase is nicer to use, but the Fox is more powerful. If pressed, I would point developers to Visual dBase, for the sake of its more elegant working environment. Serious developers should also look at other tools, including Visual Basic, Delphi and PowerBuilder.
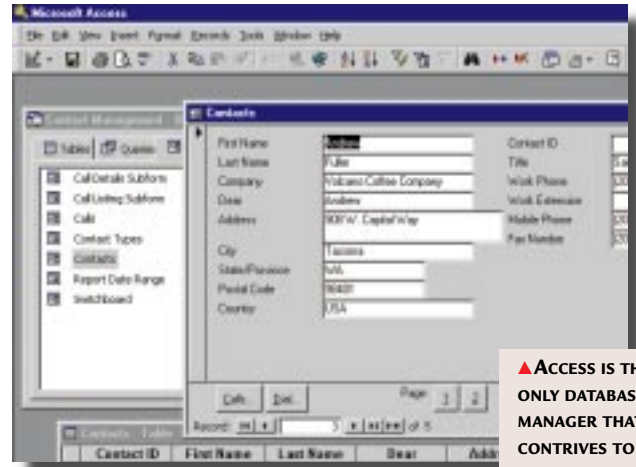
▲ ACCESS IS THE ONLY DATABASE MANAGER THAT CONTRIVES TO REACH ALL THE WAY FROM END-USERS TO DEVELOPERS

Table of features

PRODUCT	ACCESS 97	APPROACH 9	FILEMAKER PRO 4	PARADOX 8.0	VISUAL dBASE 7	VISUAL FOXPRO 6
CONTACT	MICROSOFT	LOTUS	FILEMAKER INC	COREL	INPRISE	MICROSOFT
Price ex VAT	£299.00	£39.00	£169.00	£65	£249.00	£399.00
URL	www.microsoft.com	www.lotus.co.uk	www.filemaker.co.uk	www.corel.com	www.inprise.com	www.microsoft.com
Telephone	0345 002 000	01784 455445	0845 6039100	0800 973 189	0118 932 0022	0345 002 000
Progamming Language	VB	LotusScript	✗	ObjectPal	xBase	xBase
BLOB support	✔	✔	✔	✔	✔	✔
OLE automation client	✔	✔	✗	✔	✔	✔
OLE automation server	✔	✔	✗	✔	✗	✔
ActiveX client	✔	✔	✗	✔	✗	✔
Referential integrity	✔	✔	✔	✔	✔	✔
Stored procedures	✗	✗	✗	✗	✗	✔
Transactions	✔	✗	✗	✔	✔	✔
Macro scripting	✔	✔	✔	✗	✗	✔
ODBC driver/client	✔/✔	✗/✔	✗/✗	✔/✔	✔/✔	✔/✔
Charts	✔	✔	✗	✔	✗	✔
Report designer	✔	✔	✔	✔	✔	✔
Query by form	✔	✔	✔	✗	✗	✗
Runtime version	✔	✗	✔	✔	✔	✔
Graphic fields	via OLE	✔	via OLE	✔	✔	via OLE
Counter fields	✔	✔	✔	✔	✔	✗
Encrypted data	✔	✗	✔	✔	✗	✗
HTML Export	✔	✔	✔	✔	✔	✔
Web server included	✗	✗	✔	✔	✗	✗

Questionnaire

WE KNOW FROM YOUR LETTERS AND EMAILS THAT, while many readers are home PC users, many of you make decisions about how PC equipment is purchased for business and work purposes. Here at *Personal Computer World* we try to provide the information you need to make better business decisions — but we can only do that if we know what matters to you when you are choosing machines for business. You can help us provide the service you want by completing this questionnaire. And if an even better, more helpful *Personal Computer World* isn't a good enough reason on its own, we've got £200 of Eurostar vouchers to give away so that you can whisk a friend or partner away for a special weekend. We are also giving away 50 *Personal Computer World* conference bags.

If you do not want to cut out the questionnaire, please photocopy it and send it to the address at the end of this survey [p237]. It doesn't need a stamp. The Eurostar vouchers will be given to the first name drawn out of the hat on 1st November 1998.

Your answers are confidential and your name will not be added to any mailing lists as a result of sending in this survey. If you don't want to enter the draw, then just leave the name and address blank — but please feel free to complete the questionnaire anyway.

PERSONAL COMPUTER WORLD

---

1 *Are you involved in your company's decisions about buying PCs?*

Yes ☐ 1 - This questionnaire is for you. Please let us know your views.

No ☐ 2 - This questionnaire isn't really for you. But you can still fill it out and enter the draw if you want.

2 *Do you authorise, recommend or specify your company's PC or PC-related purchases?*

I authorise purchases ☐ 1 *Please answer Q3*
I recommend purchases ☐ 2 *Please answer Q4*
I specify purchases ☐ 3 *Please answer Q4*

3a *What is your annual PC equipment and software budget?*

Under £1,000 ☐ 1
£1,000 - £4,999 ☐ 2
£5,000 - £9,999 ☐ 3
£10,000 - £19,999 ☐ 4
£20,000 - £49,999 ☐ 5
£50,000 - £99,999 ☐ 6
£100,000 - £250,000 ☐ 7
Over £250,000 ☐ 8

3b *Do you expect your budget for next year to increase, decrease or stay about the same?*

I expect the budget will increase next year ☐ 1
I expect the budget will decrease next year ☐ 2
I expect the budget will be about the same next year ☐ 3

4 *How often are you involved in decisions to purchase PCs for your company?*

Every week or two ☐ 1
About once a month ☐ 2
Five or six times a year ☐ 3
Three or four times a year ☐ 4
Once or twice a year ☐ 5
Less often ☐ 6

5 *Which of the following are you planning to buy for business use in the next twelve months?*

Hardware

Network servers ☐ 1
Desktop ☐ 2
Notebook ☐ 3
Palmtop/PDA ☐ 4
Laser printer ☐ 5
Inkjet printer ☐ 6
Scanner ☐ 7
Modem ☐ 8
17" monitor ☐ 9
21" monitor ☐ 10
Processor upgrade ☐ 11
Memory upgrade ☐ 12
Storage ☐ 13
Digital Camera ☐ 14
Mobile phone ☐ 15

Services

Internet access ☐ 16
On line data ☐ 17
Other *(please specify)* ☐ 18

Software

Networking software *(e.g. Windows NT)* ☐ 1
Office suite ☐ 2
Word processing ☐ 3
Spreadsheets ☐ 4
Graphics/DTP ☐ 5
Finance/accounting ☐ 6
Personal organiser/Scheduler ☐ 7
Project management ☐ 8
Database ☐ 9
Telephone contact management ☐ 10
E-mail or Internet related ☐ 11
Other *(please specify)* ☐ 12

6 *How many PCs did your company purchase last year?*

None ☐ 1
Less than five ☐ 2
6-10 ☐ 3
11-20 ☐ 4
21-50 ☐ 5
Over 50 ☐ 6
Don't know/can't remember ☐ 7

CHOOSING PCs AND PC PRODUCTS

7 *Do you have a company policy to always buy PCs and PC products from the same supplier or from an approved list?*

Yes ☐ 1   No ☐ 2

IF YES: Which suppliers or manufacturers would you buy from? *Please write the names of your top* **three** *approved suppliers in the space below.*

_____

_____

_____

8 *When you are considering the choice of* **supplier** *of a PC or PC related equipment, what factors influence you in choosing one supplier over another? (We are assuming that there is a choice of suppliers, all of whom offer the basic spec required at similar prices.) Please indicate (i) the most important factor, (ii) the second most important factor, and (iii) the third most important factor by ticking* **once** *in each column below.*

	(i) Most most important	(ii) 2nd most important	(iii) 3rd most important
Low price	☐ 1	☐ 2	☐ 3
Reputation of supplier	☐ 1	☐ 2	☐ 3
Speed of delivery	☐ 1	☐ 2	☐ 3
After-sales service	☐ 1	☐ 2	☐ 3
Global presence	☐ 1	☐ 2	☐ 3
Availability of specific brands	☐ 1	☐ 2	☐ 3
Quality of service/product support	☐ 1	☐ 2	☐ 3
Reputation of products	☐ 1	☐ 2	☐ 3
Knowledge of business (user) requirements	☐ 1	☐ 2	☐ 3
Location of supplier	☐ 1	☐ 2	☐ 3
Installation support	☐ 1	☐ 2	☐ 3
Previous business relationship	☐ 1	☐ 2	☐ 3
Recommendation	☐ 1	☐ 2	☐ 3
Full service vendor	☐ 1	☐ 2	☐ 3
Other *(please specify)*			
_____	☐ 1	☐ 2	☐ 3

9 *IF PRICE IS A FACTOR (i.e. ticked at question 8): How do you find the cheapest available supplier?*

Please tick all that apply

Compare advertised prices in a monthly IT magazine *(e.g. PERSONAL COMPUTER WORLD)*	☐ 1
Compare advertised prices in national newspapers	☐ 2
Compare advertised prices in the business press *(e.g. The Economist)*	☐ 3
Compare advertised prices on the Internet	☐ 4
Compare prices at a large outlet *(eg PC World)*	☐ 5
Ring round a number of suppliers for quotes	☐ 6
Rely on previous experience of suppliers	☐ 7
Personal recommendation	☐ 8
Delegate price comparisons to someone else	☐ 9
Other *(please specify)*	
_____	☐ 10

10 *IF REPUTATION IS A FACTOR (i.e. ticked at question 8): Listed below are some of the things that go towards making up the reputation of PC suppliers. For each one, please indicate how important you think it is by ticking the appropriate box.*

	Very important	Quite important	Not very important	Not at all important
Advertisements in specialist IT magazines *(like PERSONAL COMPUTER WORLD)*	☐ 1	☐ 2	☐ 3	☐ 4
Advertisements in national newspapers	☐ 1	☐ 2	☐ 3	☐ 4
Advertisements in the business press	☐ 1	☐ 2	☐ 3	☐ 4
Advertisements on television/radio	☐ 1	☐ 2	☐ 3	☐ 4
Brands available	☐ 1	☐ 2	☐ 3	☐ 4
Suppliers' own web-sites	☐ 1	☐ 2	☐ 3	☐ 4
Manufacturer or supplier literature and mailings	☐ 1	☐ 2	☐ 3	☐ 4
Recommendations/test results in magazines like PERSONAL COMPUTER WORLD	☐ 1	☐ 2	☐ 3	☐ 4
Recommendations from friends/colleagues/consultants	☐ 1	☐ 2	☐ 3	☐ 4
Previous experience of the company	☐ 1	☐ 2	☐ 3	☐ 4
Other *(please specify)*				
_____	☐ 1	☐ 2	☐ 3	☐ 4
_____	☐ 1	☐ 2	☐ 3	☐ 4

11 When you are considering the choice of products, what factors influence you in choosing one **brand** over another? *(We are assuming that there is a choice of brands which offer a similar specification or function.)* *Please indicate (i) the most important factor, (ii) the second most important factor, and (iii) the third most important factor by ticking* **once** *in each column below.*

	(i) Most important	(ii) 2nd most important	(iii) 3rd most important
Low price	☐1	☐2	☐3
Reputation of products	☐1	☐2	☐3
Speed of delivery	☐1	☐2	☐3
Technical superiority/Innovation	☐1	☐2	☐3
After-sales service	☐1	☐2	☐3
Compatibility with existing machines	☐1	☐2	☐3
Global presence	☐1	☐2	☐3
Low cost of ownership	☐1	☐2	☐3
Reliability	☐1	☐2	☐3
Installation support	☐1	☐2	☐3
Upgradability	☐1	☐2	☐3
Recommendation	☐1	☐2	☐3
Full service vendor	☐1	☐2	☐3
Other *(please specify)*			
_____	☐1	☐2	☐3

12 *IF PRICE IS A FACTOR (i.e. ticked at question 11):* **How do you find the cheapest available brand?**

Please tick all that apply

Compare advertised prices in a monthly IT
magazine *(e.g. PERSONAL COMPUTER WORLD)* ☐1
Compare advertised prices on the Internet ☐2
Compare prices at a large outlet *(e.g. PC World)* ☐3
Read reviews/comparative tables in the PC press ☐4
Ring round a number of suppliers for quotes ☐5
Personal recommendation ☐6
Delegate price comparisons to someone else ☐7
Other *(please specify)*
_____ ☐8

13 Listed below are some of the factors that might lead people to **change** the brand of PC or PC related products that they buy. *Please tick all of the factors that you think might affect you.*

Press advertisements ☐1
Poster/outdoor advertising ☐2
Television/Radio ☐3
Word of mouth ☐4
Reviews and lab tests ☐5
Price/value for money ☐6
Product literature/direct mail from manufacturer ☐7
Design and technology ☐8
Reputation ☐9
Web presence ☐10
Availability of product ☐11
Personal experience ☐12
Other *(please specify)*
_____ ☐13

YOUR WORK

14 *Is your job principally concerned with IT?*

Yes - my main work area is IT ☐1
No - my main work area is outside IT ☐2
I have a general responsibility which includes IT
but I am not an IT professional ☐3

15 *Please tick the box below which best describes your job title.*

Owner/Partner ☐1
Director ☐2
General manager ☐3
IT/network/telecomms manager ☐4
Technical support manager ☐5
Purchasing manager ☐6
Other manager/Department head ☐7
Executive ☐8
IT Consultant ☐9
Management consultant ☐10
Other *(please specify your job title)* ☐11
_____

16 ▶ About how many people does your company employ?

- Less than ten □ 1
- 10 - 49 □ 2
- 50 - 99 □ 3
- 100 - 199 □ 4
- 200 - 499 □ 5
- 500 or more □ 6

17 ▶ What type of work does your company do? (Please tick the one item that best describes your company's work.)

- Civil Engineering/Construction □ 1
- Computers/Information technology □ 2
- Defence □ 3
- Education □ 4
- Energy (Oil, gas, electricity) □ 5
- Finance/Banking/Insurance □ 6
- Government/public services □ 7
- Industry/industrial engineering/manufacturing □ 8
- Law/Accountancy/Management consultancy □ 9
- Media □ 10
- Medical/pharmaceutical □ 11
- Retail and distribution □ 12
- Telecommunications □ 13
- Travel □ 14
- Other (please specify) □ 15 □

18 ▶ Which of the following areas do you get involved in?

- General Management □ 1
- Sales & Marketing □ 2
- Finance □ 3
- Production □ 4
- Information Technology/Networks/Communications □ 5
- Research and Development/Corporate Planning □ 6
- Customer service □ 7
- Other (please write on the line below) □ 8

19 ▶ When your company buys computers are these purchased retail or direct? (Please tick all that apply.)

- Retail □ 1
- Direct from manufacturer □ 2
- Direct from reseller □ 3
- PC dealers □ 4
- Via consultant □ 5
- Other (please write in) □ 6

PERSONAL COMPUTER WORLD

20 ▶ Do you have a subscription to PERSONAL COMPUTER WORLD?

Yes □ 1   No □ 2

21 ▶ How often do you read PERSONAL COMPUTER WORLD?

- I read almost every issue □ 1
- I read most issues (around 3 out of 4) □ 2
- I only read it occasionally □ 3

22 ▶ Here are a number of things that people have said about PERSONAL COMPUTER WORLD. Please tick the appropriate box beside each statement to indicate how much you personally agree or disagree.

	Agree a lot	Agree a little	Neither agree nor disagree	Disagree a little	Disagree a lot
I use information that I get from Personal Computer World in choosing PCs to purchase	□ 1	□ 2	□ 3	□ 4	□ 5
I use information that I get from PERSONAL COMPUTER WORLD in purchasing peripherals/components	□ 1	□ 2	□ 3	□ 4	□ 5
PERSONAL COMPUTER WORLD's reviews help me choose between brands	□ 1	□ 2	□ 3	□ 4	□ 5
The main value of PERSONAL COMPUTER WORLD is in the editorial information	□ 1	□ 2	□ 3	□ 4	□ 5
The main value of PERSONAL COMPUTER WORLD is in the advertisements	□ 1	□ 2	□ 3	□ 4	□ 5
I value both the editorial and the advertisements	□ 1	□ 2	□ 3	□ 4	□ 5
The new look in this issue is a big improvement	□ 1	□ 2	□ 3	□ 4	□ 5
It is much easier to find things in the new layout	□ 1	□ 2	□ 3	□ 4	□ 5
The new look PERSONAL COMPUTER WORLD is much easier to read	□ 1	□ 2	□ 3	□ 4	□ 5

23 ▶ If you could change one thing about the new look Personal Computer World, what would it be?

_____

_____

_____

24a *Do you ever retain **features or reviews** from PERSONAL COMPUTER WORLD for future reference on products or prices?*

Yes ☐ 1 *Please answer Q24b*
No ☐ 2 *Please skip to Q25*

24b *About how often do you do so?*

Every issue ☐ 1
Most issues ☐ 2
Only occasionally ☐ 3

25a *Do you ever retain **advertisements** from PERSONAL COMPUTER WORLD for future reference on products or prices?*

Yes ☐ 1 *Please answer Q25b*
No ☐ 2 *Please skip to Q26*

25b *About how often do you do so?*

Every issue ☐ 1
Most issues ☐ 2
Only occasionally ☐ 3

26 *Have you ever made an enquiry or bought something as a result of an advertisement in PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

27a *Which of these other computer magazines have you read or referred to in the past six months?*

27b *Which do you find gives you the most useful information that you can use in making buying decisions?*

	a/ read	b/ find most useful
Computer Buyer	☐ 1	☐ 1
Computer Shopper	☐ 2	☐ 2
ComputerAct!ve	☐ 3	☐ 3
Computing	☐ 4	☐ 4
Information Week	☐ 5	☐ 5
IT Week	☐ 6	☐ 6
PC Advisor	☐ 7	☐ 7
PC Direct	☐ 8	☐ 8
PC Magazine	☐ 9	☐ 9
PC Plus	☐ 10	☐ 10
PC Pro	☐ 11	☐ 11
PERSONAL COMPUTER WORLD	☐ 12	☐ 12
What PC? And Software	☐ 13	☐ 13

28 *Do you ever retain **features or reviews** in computer magazines other than PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

29 *Do you ever retain **advertisements** in computer magazines other than PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

30 *Have you ever made an enquiry or bought something as a result of an advertisement in another computer magazine?*

Yes ☐ 1   No ☐ 2

31a *Have you ever made an enquiry or bought something as a result of an advertisement in the national or business press?*

Yes ☐ 1 *Please answer Q31b*
No ☐ 2 *Please skip to Q32*

31b *Which newspaper/magazine was this? (Please specify)*

_____
_____

AND FINALLY

32 *How old are you?*

Under 25 ☐ 1
25 - 34 ☐ 2
35 - 44 ☐ 3
45 - 54 ☐ 4
55 - 64 ☐ 5
65+ ☐ 6

THANK YOU FOR YOUR HELP

Your reply will be treated in the strictest confidence and analysed in statistical form only. However, if you want to take part in the prize draw to **win £200 worth of Eurostar vouchers**, please fill in your name and address in the space below.

Name: _____

Address: _____
_____
_____

Please return this questionnaire to:
PERSONAL COMPUTER WORLD SURVEY,
c/o NSM, FREEPOST, Oxford OX2 7BR
YOU DO NOT NEED A STAMP

NASA plans to evolve an interplanetary internet, linking earth and space. Toby Howard reports.

Into the outernet

Illustration courtesy of NASA/JPL/Caltech

▲ One day, 'InterPlaNet' could unify space and terrestrial communications

It is 20 years since Vint Cerf co-invented TCP/IP, the standard data code which made the modern internet possible. Having seen the net grow to today's world-circling web, Cerf now has a bigger idea. He plans to take cyberspace into outer space. Cerf has just been appointed Distinguished Visiting Scientist at NASA's Jet Propulsion Laboratory. Together with Adrian Hooke, manager of NASA's Space Mission Operation and Standardization Program, Cerf's brief is to find a way to merge the work of the space communications and internet communities.

Just as the web provides an integrated interface to the data moving across the net, Cerf envisions a solar system-wide web, unifying space and terrestrial communications. NASA sees this interplanetary internet, or "InterPlaNet", as the future of space communications. Currently, space comms technology encodes data in different ways to suit particular mission requirements. There are no multimedia standards, as on the internet; no point-and-click interfaces; no standard mechanisms to upload new programs to control spacecraft or planetary landers. "It took 20 years for the internet to take off here on Earth," Cerf said recently. "It is my guess that in the next 20 years we will want to interact with systems and people visiting the Moon, Mars and possibly other celestial bodies."

NASA is already convinced. It wants to employ the Interplanetary Internet in its forthcoming Mars missions, and has plans to leave special satellites in orbit as a first step to creating internet servers in space. But Cerf's vision is as technically demanding as it is fascinating. Just as the terrestrial internet brings together smaller networks in cities and countries, the goal of the Interplanetary Internet is to link together nets on different planets and their moons. Special interplanetary gateways will convert the Interplanetary Internet data protocols to conventional TCP/IP, connecting (in NASA-speak) "dirt-side to space-side".

The Interplanetary Internet will need a robust data transmission protocol. Traditional TCP/IP won't do because transferring data across space has its own problems. First there's interference. As far as man-made radio waves are concerned, empty space is a noisy place. As well as the natural radio emissions from stars and planets, cosmic rays cause unpredictable distortions in spacecraft transmissions. A more serious problem is the time-lag which results from the vast distances involved and nature's unbreakable limit of the speed of light. A radio signal, transmitted from Mars, say, takes several minutes to reach Earth, and the transfer time varies constantly. But Cerf is confident that the technical problems are soluble. "The time has come to think beyond the Earth," he says.

Some people worry about taking the web into space, fearing that we might be exposing ourselves a little too much to scrutiny by extra-terrestrials. It's not quite as daft as it sounds. Suppose aliens spot our planet and want to eavesdrop on us. The web is a perfect resource

In the next 20 years, we will want to INTERACT WITH SYSTEMS AND PEOPLE VISITING THE MOON, Mars and possibly other celestial bodies

for them, far better than fiddly radio and TV transmissions which bubble out in spheres of ever-decreasing intensity: the web just sits there with its data intact, accessible to any alien with the latest quantum snooping gear. Take the web into space, and we really start advertising our presence. One day, ET will surely say hello. Let's hope the email is friendly.

futures

Ian Robson reviews the startling developments in the presentation of holographic videos in 3D.

Altered perceptions

Sci-Fi films would have you believe that a holographic video is a 3D real-time video display projected into thin air. In reality, there is no way of producing such a display without the use of a capturing medium; thin air is not one of them. But other methods are producing startling results. Philips Research Laboratories has developed the Auto-

> To enhance the 'natural experience', the developers **SPLIT THE VIEW INTO FOUR,** so each lenticular lens covers four columns of pixels on the LCD

Stereoscopic 3D-LCD, combining its lenticular lens screen and LCD technologies to produce effective holographic video displays which appear to be as deep as they are wide. The lenticular lens screen sits on top of a normal LCD screen and is made up of vertical arrays of small cylindrical lenses which split the image into a number of views. The resulting image is horizontal parallax only (you see it only in the horizontal plane).

To get an idea of how these views work, hold an orange in front of your face. Close each eye in turn and you will see a

▼**Fig 2 Diagram of a Four-view 3D-LCD**

slightly different view of the orange but they will both be in the same horizontal plane. A two-view lenticular lens does the same thing, projecting left and right views from two columns of pixels on the LCD screen, so the resulting image is perceived by the viewer as three dimensional. The fact that the viewer needs no special glasses is a major contributing factor to the "natural experience" but this two-view set-up means you can only see the image from one fixed point in front of the screen. To enhance the natural experience, the developers split the view into four, so each lenticular lens covers four columns of pixels on the LCD. This gives a wider viewing angle but reduces the horizontal resolution by half, compared to a two-view lens.

A four-view system is shown in Fig 2, with an enlarged portion of the LCD and attached lenticular lens screen on the left. The black line between each projected view is caused by the LCD's opaque black mask which runs between each pixel of the display and prevents light leakage from areas of the liquid crystal that are not modulated by any voltage. When the viewer moves his head horizontally across the display it appears as a "now you see it, now you don't" effect. Blurring the boundaries between the four views created by each lens spreads out the black mask image, softening the transition between one view and the next. This encourages the viewer to perceive "solid objects" rather than being distracted by the black lines.

Progress in this field has been rapid, driven by interest from such diverse parties as medical institutions to home entertainment companies. Ultimately, though, the LCDs will have to improve before the technology can progress. An LCD with a horizontal resolution of 1,920 liquid crystal elements will have just 640 pixels. As it takes four pixels to create one four-view, a four-view 3D-LCD display will therefore have a resolution of just 160. Philips has developed a 14.5in 3D-LCD screen [Fig 1] which should be available soon to help developers create new applications. Games developers may jump at the chance.

PCW CONTACTS

hands on

contents

Are you looking for a way to keep in touch with your friends or contacts online, even if they don't work in the same office or share your network? This month's Workshop on **instant messaging services** shows you how to download and install the necessary software to do this using the internet. Not only is it easy, but it's also free. Perhaps you find yourself on the move and you're after some ideas on how to use your **laptop** more effectively? Mark Whitehorn makes sure we're happy travellers with his handy hints on choosing and using your notebook. And Cliff Joseph has been out and about: just back from his trip to this year's MacWorld Expo in New York, he has installed a beta version of **MacOS 8.5** and introduces us to some of the new features we can expect from this upgrade when the final version hits the streets. Over in **Graphics & DTP**, Ken McMahon points us in the direction of some free images, while Roger Gann examines some of the undocumented yet useful features of DOS in **16-Bit**. As always, hints, tips, suggestions and ideas are more than welcome.

NIK RAWLINSON, *HANDS ON* **EDITOR**
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PCW Hands On on CD-ROM

Now it's easy to find that *Hands On* tip, trick, advice or review again. There's a whole year's worth of columns on our monthly *PCW* CD-ROM. So if that handy hint is on the tip of your tongue, don't sit and sweat: the answer is at your fingertips with our cover CD.

Chat lines

Chatting on the net? Nik Rawlinson explains instant messaging, a practical way to communicate.

Internet Relay Chat (IRC) is great for chatting to friends and keeping in touch with people who have common interests; but outside of these fairly constrained bounds, it has little in the way of practical use. It has no search facility to allow you to contact specific users, unless you have previously met them online and added their nickname to your notify list. When you log off, you are effectively cut off from the whole IRC community until next time you log on. It will not keep messages for you, nor forward them to your mailbox — you are, to all intents and purposes, non-existent.

A more suitable alternative, therefore, would be something that maintained a virtual presence even when your connection is not active. It could also take care of any messages that other users want to send you when you're not logged on, simultaneously offering a powerful search engine that would enable you to contact users with whom you share a common interest. Impossible? Not at all. Expensive? Certainly not, and there are a number of options available.

ICQ

We'll start with the most complex option, but before firing up your net connection, a quick hunt around in your Windows\System directory can save you some time. Search for a file called MFC42.DLL. If it's there, you've just saved yourself a 0.5Mb download. If not, you can get it at the same time you download your new software.

1 **Connect to the net** and point your browser at www.mirabilis.com/download/.
Here you will be presented with eight different flavours of the ICQ (*I-seek-you*) software. Select the most appropriate version for your operating system.

2 **On the following page**, click the link to download the software. If you already have MFC42.DLL in your
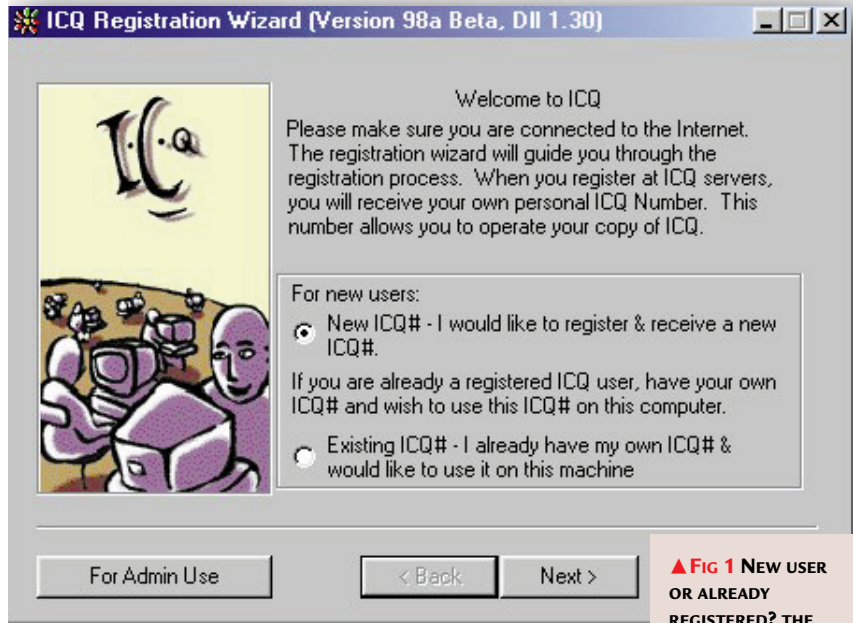
Windows\System directory, select the second option. This will download a 1.1Mb file (as opposed to the first 1.6Mb option). Don't try to cheat the system by downloading the smaller file if you haven't got MFC42.DLL: although it will download, the software will not work and you'll have to start again.

3 **Once the download** is complete, resist the temptation to close your net connection, because the installation process involves a certain amount of to-ing and fro-ing of data between your PC and the Mirabilis servers. Double-click the icon for the file you have just downloaded and follow the usual procedure for installing it into your chosen directory.

☛ **You will also be offered** the opportunity to include ICQ on your Start menu. While this is helpful, it is not essential as the latter stages of the installation will drop ICQ's Net Detect Agent into your system tray. This will keep an eye on your internet connection and, when it detects that you have gone online, fire-up ICQ and let your contacts know that you have connected, informing you which of your contacts are online.

Impossible? Not at all. Expensive? Certainly not

4 **Once installation** is complete, you will find yourself faced with the ICQ registration wizard. This is the equivalent of registering your mobile phone with the network. By the end of it, you will have your own unique ICQ number through which other users can contact you.

5 **If you are a new user**, click "next" or select "Existing ICQ#", and supply the details you entered the previous time you installed [Fig1].

6 **We will assume** that you are running ICQ through a standard dialup connection. If you are lucky enough to enjoy a permanent leased line or connect over a network, you will have to ask your system administrator for the address of your firewall and/or SOCKS server, and enter the details .

7 **On the screen** that follows, enter your email address, your first and last names, and a nickname. Because a string of numbers is not very memorable (take CompuServe email addresses, for example) this is how you will be identified in the main ICQ window of other users. Your nickname can be your real name or something completely random, but many users choose to base it on their location or interests. Now click "next".
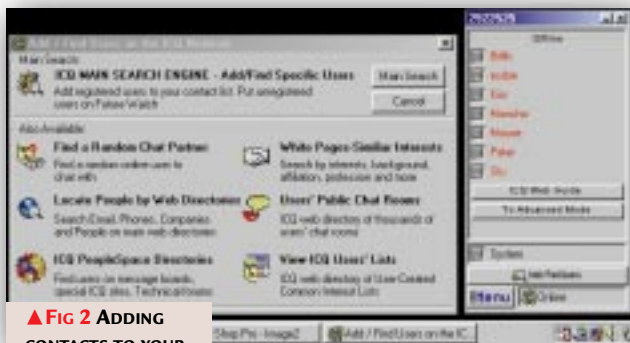
8 **The next screen** is entirely optional but completing it will help other users to make contact with you. Fill in the boxes to include your location, age and interests. These will be added to the Mirabilis database, making you visible to other users while you are offline.

9 **Click "next"** and you will be presented with Mirabilis' two-question survey about your occupation and how you plan to use ICQ. Completing it is optional. If you do not wish to be included, select the option to be excluded and click "next".

10 **Choose a password** to protect your ICQ number. The clever thing here is that by checking the "Auto Save Password" box it is not necessary for you to remember it. Neither will you need to enter it each time you connect to the ICQ network. The option box below this allows you to put restrictions on who can contact you while you are online. Leaving it on the default setting means that any and all other ICQ users can contact you, add themselves to your contact list and effectively send messages that will flash in your system tray while you are online.

11 **Click "next"** for your unique ICQ number. Click "next" again.

AOL's IM will work in the UK with no problems

12 **If you want** others to be able to use their ICQ interfaces to send mail direct to your regular email inbox, enter the address of your SMTP server (if you don't know what it is, your ISP will be able to tell you). Click "next" again.

13 **The Contact List Wizard** will appear. This allows you to search the ICQ database to add contacts to your list. However, it is easier to click "cancel" here and then "Add/Find Users" on the ICQ window that will now be active on your desktop. This gives you the option of searching on more meaningful parameters than just ICQ numbers or email addresses, and instead locate users by interest or location [Fig 2].

AOL Instant Messenger

AOL members have been using the service's Instant Messenger (IM) option for years, but now it is open to the internet community at large without the need to pay a subscription to the company itself. Unlike the Yahoo and ICQ services it is currently not possible to search for members' profiles unless you are a paying AOL member and, instead of using this internet-based service, actually log on to your account.

1 **AOL's UK site** is quite adamant that this service is "coming soon", so why not pop over to the US service at www.aol.com/aim/ and download it from there? It will work in the UK with no problems.

2 **Non-AOL members** must select a screen name of between three and ten letters. The great thing here, however, is that unlike many online services, your screen name can be made of not only letters and number also spaces [Fig 3].

3 **If you already** have an account with AOL, click the AOL member icon and enter your screen name and the postcode you used to register with the service.

4 **Select the appropriate** version of the software from the four operating

systems listed, and the installation software will be downloaded to your PC. Again, once the download is complete, maintain an open connection to your ISP.

5 **Execute the downloaded file** and it will run you through the usual Windows software installation routine. It is advisable to choose the option to launch AIM (AOL Instant Messenger) when Windows starts, as this will perform a similar function to ICQ's Net Detect Agent in starting up the software each time you connect. Tell the system whether you are connecting to the net

using a modem or a LAN and click "next" to expand the files on to your hard drive.

6 **Once installation** is complete, you will need to register with the service. If you are an existing AOL member, click "Use AOL Screen Name", otherwise opt for "Register new screen name".

7 **Enter your screen name** and password in the new window that appears, and check the "Save password" and "Auto Login" boxes. This enables the system to connect to the network each time you connect to your ISP, without you having to do anything. Click "Sign On".
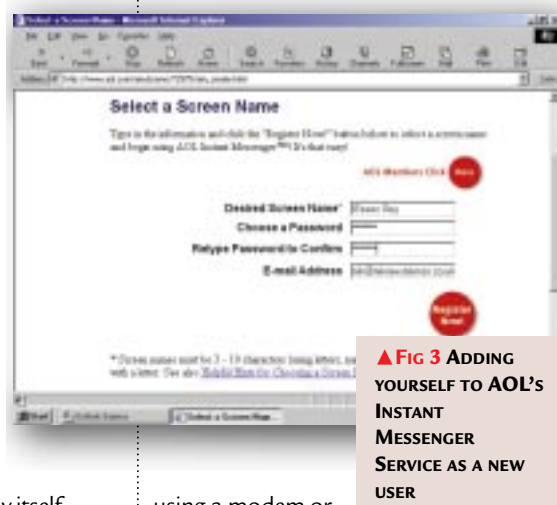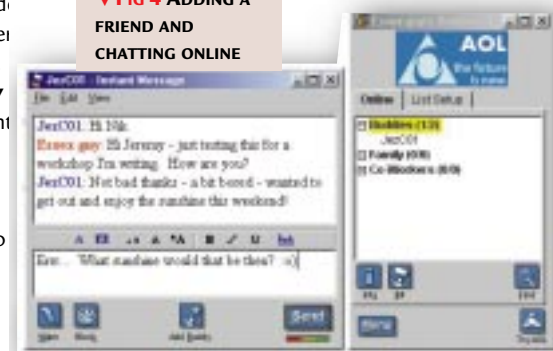
8 **Once you get connected**, to add users to your list of contacts you merely click the "List setup" tab followed by "Add Buddy" and enter the AOL screen name [Fig 4]. The disadvantage here, of course, is that you have to know your contact's screen name before you can add them to your list instead of being able to search online.

Yahoo! Pager

At just a 436Kb download, Yahoo Pager could be thought of as the economy option. But its feature-packed service would indicate otherwise.

1 **Follow the link** from http://pager. yahoo.com/ to download the software and install by double-clicking the icon of the file you have downloaded to your hard drive. Click "next" to progress through each installation screen. When you come to the options dealing with running the pager when you start your computer (and allowing other users to connect directly with your pager), leave them both unchecked and click "next" to complete the installation. This will allow other Pager users to chat with you, and save you from having to activate the program yourself.

2 **Once the installation** has been completed, you will be presented with the login screen. Making sure that your internet connection is active, click "Get a Yahoo! ID" and complete the empty boxes on the web page that it will load into your browser. The "Password Question" option is simply requesting a question that the system can ask you should you forget your password. If you supply the correct answer, as specified in the box that

follows, it will reveal your password. When it asks for your Zip code, click the button marked "this form" to be transported to the international sign-up screen into which the answers you have already supplied will be transferred.

☞ **Don't forget** to check the appropriate box for receiving further information (or not) and submit your answers to generate your free pager account.

3 **Return** to the pager log-in screen and enter your new user name and password. Remember to check the box to save your password (so that you do not have to type it in each time you use the pager) and then click OK.

4 **To add contacts,** click "Find New Friends" [Fig 5]. This presents one of the most comprehensive search engines of all, enabling you to narrow your search by interest, location and name. For example, enter "cat" in the "interest" box to list users with an interest in cats, and click on the user names of the pager owners which match your search, to view their profiles. To add your chosen user to your user list, click the link at the bottom left of their profile.

5 **Creating your own profile** will let others find you. Click "profile" on the Yahoo! Pager toolbar, followed by "Create/Edit my Profiles". From the web

page that this button loads, click "Edit" and fill in the appropriate boxes. What you include on this page is optional, but it should be remembered that anything you say will be accessible to anyone with an internet connection [Fig 6].

Hello, goodbye

While Yahoo! Pager and AOL's Instant Messenger may offer little over and above what is available to regular IRC users, the fact that they run in the background means that they can be permanently active without consuming excessive resources. ICQ, on the other hand, could, at a push, when combined with the various free email services on the net, do away with the need for a separate mail package and leave all of your communication tools just a double-click of the system tray away. Download them, install, and next time you see me online, be sure to say hello.

◄**Fig 6** **A Yahoo! Pager profile screen**

PCW CONTACTS

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AOL *Instant Messenger name* Essex Guy
ICQ *Number* 2922525
Yahoo! *Pager name* EssexNik

Lapping it up

The perfect laptop is not yet with us, but still, there is some impressive kit out there. To help you make your choice, Mark Whitehorn presents a guide to the traveller's friend.

The perfect laptop is light, slips into a pocket, has a full-size keyboard and a 17in screen — let me know when you find one! Trapped as we are within the confines of current technology, this ideal specification will inevitably be subject to a degree of compromise. In fact, laptops are all about compromise. Our current state of technology permits no alternative to the fact that a laptop with a 15in screen has to be at least 15in along one of its dimensions. So, unless you have very large pockets, something has to give.

Not that companies haven't tried to provide workarounds. IBM's "butterfly" keyboard of some years ago was an ingenious attempt to defy the laws of physics. The keyboard folded out to full size as you opened the machine, full size being at least two inches wider than the closed laptop's footprint — clever. It even worked, to an extent, but the fact that IBM no longer makes them is an indication that the design was a little too compromised. The mechanical complexity of the keyboard movement often became worn enough to allow the closing lid to catch the retracting keyboard, potentially biting off the extra. In addition, the "feel" of the keyboard itself was compromised. As a confirmed gadget freak I still have one and love it's ingenuity, but it is now a museum piece that has to be closed very, very carefully. Laptops are similar to, but not the same as, desktops. So it is worth considering the following before you buy:

■ Screen technologies
There are many types of screen technologies used in laptops. On a secondhand machine you might still find a **plasma** display. This uses an ionised

gas, sandwiched between two wired panels: one with vertical wires, the other with horizontal. A bright orange glow is produced whenever two charged wires cross, producing pixels. Plasma displays are power-hungry and monochrome, so they are fast disappearing. They can also be dim.

▲ **With built-in CD-ROM, some laptops could replace your desktop**

When using on holiday in France, I was reduced to placing the whole machine inside a cardboard box to shade the screen to make it visible. The locals wrote me off as an eccentric Brit concerned about sunburnt hands... Happily, things have improved and new screens are much better, although the range of options can be unnerving: TFT, active-matrix, CSTN, HPA, passive-matrix, supertwist, double and triple supertwist — so the list goes on. In general, there are two technologies out there, passive and active.

Passive-matrix consists of a grid of horizontal and vertical wires. An LCD element (pixel) exists at the intersection of each pair of wires which can either let

The innards of a laptop are more crowded than the M25 on a Friday night
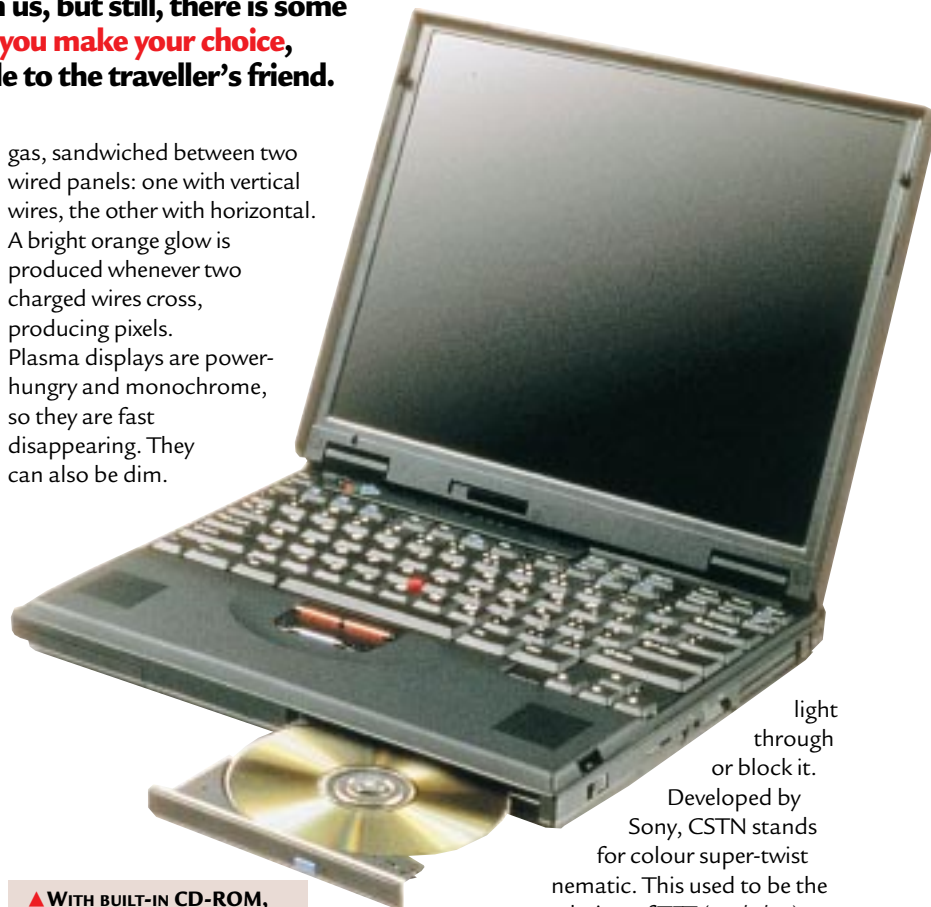
light through or block it. Developed by Sony, CSTN stands for colour super-twist nematic. This used to be the poor relation of TFT (*see below*) but recent advances in the technology have made it a viable alternative to active-matrix displays, at about half the cost. Some people actually prefer this type of display to TFT, when used in bright light conditions.

Active-matrix, also known as TFT, stands for Thin Film Transistor. It is a type of LCD screen in which each pixel is controlled by between one and four transistors. The TFT technology provides the best resolution bar none. For active, read expensive; but these screens are superb. I use a portable with a 14.1in TFT screen, and I now use it in preference to a VDU as I think the image is better.

■ Screens in general
The physical size of the laptop is generally limited by the screen or the keyboard, so don't just go for the largest screen that you can afford. Think carefully, because large laptops are a pain in the briefcase. You may find, on TFT screens, one or

more "dead" pixels. They may be stuck in one colour (red, blue, or green) or dead (black). The bad news is that a transistor controlling the pixel has died; the good news is that this is not an uncommon occurrence, given the number of transistors in a single display.

Whether you want — or are able to — return the machine for a replacement is up to you and to the supplier. Some manufacturers take the view that one or two bad transistors out of so many is good enough, while others expect to supply perfect screens. In general, the more you pay, the more chance you have on insisting that the screen is perfect. And one final point: the different ways in which screen sizes are measured mean that a 15in LCD screen, whether passive or active, gives approximately the same viewing area as a 17in VDU.

■ Keyboard

Can you type on a small keyboard? If your hands are large, or your fingers spatulate, it may be physically impossible to use the smaller keyboards available. Is the tactile quality of a keyboard particularly important to you? And if so, trying out a keyboard before buying is definitely worthwhile. You're likely to be using the machine for the next two or three years at least, so making sure it suits you is time well invested.

■ Input devices

Using a mouse on an aeroplane is usually incompatible with good inter-seat relationships, and unless you travel first class, often impossible in the cramped space. So, in addition to mouse ports, laptops often come with one of several types of built-in pointing devices. Strangely, for some reason, the main contenders all start with the letter T:

☛ **Trackball** — clips to the side of the keyboard.

☛ **Touchpad** — built into the front of the keyboard and driven by finger pressure.

☛ **TrackPoint** — a tiny joystick built into the keyboard and surrounded by the G B H and N keys.

Touchpads appear to be in the ascendant at the moment but it is very much a

matter of taste. I hated the early TrackPoints but have learned to live with the latest version.

Do you need a network card (*see Backup, below*)? A floppy disk drive? A CD-ROM/DVD drive? Given access to a network and a CD-ROM drive, you can largely circumvent the need for a floppy drive but you have no easy way of getting a file onto a floppy when you're away from the network. External floppy/CD-ROM drives give you something else to carry around to accompany the mains power cable with a lumpy in-line transformer. You need to consider all of this very carefully before buying. Why? Well, for a start, laptops are, as a general rule, much more difficult to upgrade than desktop machines. Let's ignore for a moment the fact that the innards of a laptop are more crowded than the M25 on a Friday night. Laptops often make use of non-standard components, which means they tend to have odd collections of drivers.

It is generally accepted that adding hardware to a laptop is a pain. A better answer is to specify the machine you require and make it SEP (Somebody Else's Problem) to ensure that they all work together in perfect harmony — before you hand over the money.

■ Backup
is of course vital, but you don't want to bolt a tape-drive onto a portable. A network card allows you access to server drives which are the perfect place for backups.

■ Batteries
The latest Li-Ion batteries are more expensive

> *Using a mouse on an aeroplane is usually incompatible with good inter-seat relationships*

▶ IN ALL SHAPES AND SIZES, THE LAPTOP COULD BE YOUR PERFECT PORTABLE PAL

than the older NiMH, although there is also a huge advantage to them — they have no memory so you don't need to deep discharge them. This is far more useful than it at first sounds, as for the first time you can simply use the battery when convenient and top it up from the mains whenever possible. Gone are the days of arriving on aeroplanes with half-empty batteries because there was no time to fully discharge and then recharge them.

■ Operating systems
Until recently, it was rare to find manufacturers who would confidently put NT on their laptops. The problem was a lack of drivers and this has been largely overcome as NT has increased in popularity. These days, it's perfectly possible to specify NT as the operating system. There is a surprising side effect/advantage of running NT and that's its built-in CPU cooler. However, if you're using Windows 95 and have a hot CPU, there's a tip which may help to reduce overheating (*p250*).

■ Windows 98
Currently, it appears that some people are experiencing problems upgrading from Windows 95 to 98 (he typed circumspectly). Look carefully at what 98 has to offer and make sure that you need some of the extra features before taking the plunge. And even when you are convinced that you need to upgrade, check for advice on your manufacturer's web site before going ahead. Manufacturers of certain models are advising against even attempting the upgrade (but don't let me put you off).

LAPTOP TIPS

WHET YOUR APPETITE FOR A COOL LAPTOP WITH WATERFALL OR RAIN

Comparison Chart

	Rain	Waterfall
System Performance	Excellent	Excellent
Cooling Performance	Excellent	Very Good
Security	Very Good	Excellent
Memory Requirement	300Kb	300Kb
CPU Monitor	No	Yes

☛ **Overheating**
Laptops compromise absolutely everything, even cooling, and some are notorious for overheating. Though, amazingly, there is a software fix you can try — in fact, two of them. These are two utilities called Waterfall and Rain that can be used on machines running Intel, Cyrix, AMD and IDT CPUs (Pentium or later). Waterfall and Rain make use of the HLT command which puts part of the CPU into suspend mode. This command can be executed while parts of the CPU are idle, saving power and dropping the temperature. You can find more, and the programs themselves, at http://cpu.simplenet. com/leading_wintech/. Neither of these programs works under NT, for the simple reason that NT already comes with an option to execute HLT instructions when the CPU is idle.

☛ **First power-up**
A friend recently interrupted the initial power-up of a Toshiba. True, a silly thing to do, but the machine had to be returned to base. The first power-up of any laptop may require you to make choices, so don't try it on the train going home. Relax and allow plenty of time; just don't turn the machine off during that initial startup!

☛ **Every laptop comes with a built-in UPS**
It may not be immediately apparent, but the battery in your laptop works in just the same way as a UPS (Uninterruptible Power Supply). So, if you are working on a desktop PC and storm clouds gather, switch over to your laptop in case the power goes down.

☛ **Finding the CMOS setup program**
The key combination to get CMOS setup varies with different machines. If your manual is missing, or doesn't supply the information, try the following early in the boot process:

```
DEL
F1
CTRL+ALT+ESC
CTRL+ALT+S
CTRL+ALT+ENTER
 FN+F1
FN+ESC
```

■ **Power saving**
Different manufacturers have differing strategies for saving power on laptops. Common ones are sleep/hibernate (states into which the machine will pass if you stop using the keyboard and mouse) but don't power the machine down. And since each manufacturer tends to define the terms differently, I'd advise sticking to generic descriptions.

☛ **In sleep mode** the system completely shuts off all the hardware (disk, screen etc.) but keeps the RAM alive. This uses a small amount of power but the system comes up very fast when you next use the machine. If it eventually runs out of power, though, you will inevitably lose the data that hasn't been saved to disk.

☛ **In hibernation mode**, the system writes everything to disk and shuts everything off, so there is no power use whatsoever. However, when you wake the machine up, it takes longer to wake than it would from sleep mode, but less time than a full reboot.

■ **Size (and weight) is important**
As a practical example, I am writing this on an IBM ThinkPad 770. It has a magnificent screen, oodles of brain, a keyboard with a good, positive feel, DVD drive, internal modem — the works. I also splashed out on the optional leather case, which was, I now realise, a huge mistake.

The leather case recently travelled to America in the hold of a Virgin Atlantic 747. While it nestled among its fellow suitcases, I was left holding the unprotected laptop for 12 hours on the flight. *Why?* Virgin decreed that the bag, laptop and accessories weighed more than the cabin baggage maximum of 5kg: the machine alone weighs a hefty 3.7kg.

As I said at the start, all laptops are a compromise. I knew all about the weight and size but I accepted those hits because I needed not just a writing machine, but a portable server. The 770 runs Windows NT and functions both as a data warehouse and an OLAP server. For writing, I carry a Psion — tiny but perfectly formed. Hmm... I wonder if I could mate them?

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graphics & DTP · databases · Internet · spreadsheets · Windows 3.1 · word processing · visual programming · networks · OS/2

hands on
internet

Good times, bad times

Bugs in email software, BT's ISDN moves on (a bit), and your queries quelled. With Nigel Whitfield.

I t's not often that words need to be eaten, but regular readers of this column might remember a couple of times when people have asked about the warning they've received telling them not to read messages that have a subject heading of "GOOD TIMES". Doing so, the warnings say, could cause problems for your PC.

The standard answer has always been that the only way reading an email message can cause problems on your system is by opening an executable attachment that contains a virus, or launching a document that has a macro virus in it. As you might have heard, however, thanks to the sterling effort of two of the most prominent net software companies — Microsoft and Netscape — that's no longer the case. Both have produced email software that is vulnerable to a particular type of attack, embedded not in an attachment itself, but in the tags that indicate there's an attachment to a message.

Half measures

They didn't do this on purpose — no-one sticks common programming errors into their software on purpose, although that's what some people think is at the root of this particular problem. But what both companies *are* guilty of is releasing half-finished, bloated software using magazine CDs and online downloads, to ensure that it reaches as many people as possible. Sometimes, there are useful new features in the latest web browser or email client. Java has certainly helped make some aspects of the web more usable. Dynamic HTML has promise. Depending on your personal feelings, you could view HTML email as a boon, or as an irritating infestation in your inbox. But would the world have ground to a halt if we'd had to wait a few more months for any of these features? It's unlikely. There's far more potential for damage to business

caused by sloppy programming leaving gaping security holes in mail programs, than by your boss not being able to send you email with red, underlined text in it. I'm sure the race to add more features and come out with browsers that have higher version numbers than the competition must be tremendously exciting for employees at Netscape and Microsoft, but it leaves many net users cold. Perhaps it's time more users stopped allowing themselves to be sucked into this rat-race of one-upmanship, and made their views clear? Reliable software should be a primary consideration. And if Netscape wants to survive as a player in the browser market, it might do well to concentrate on security and reliability; the ways of Microsoft are, sadly, unlikely to change.

The internet is a great tool. It's a shame that some of the best-known software companies view it chiefly as one they can use to send us beta-grade browsers in a race to score points against each other. So, next time someone offers you a new browser or email client, stop and think before installing it. Which bugs do you want on your system today?

The next time someone offers you a new browser or email client, stop and think before installing it

Highs & lows

Have you been waiting for ISDN to be a reasonable proposition for home users? If so, you've probably heard about BT's Home Highway service, and by the time this issue of *PCW* hits the streets you may
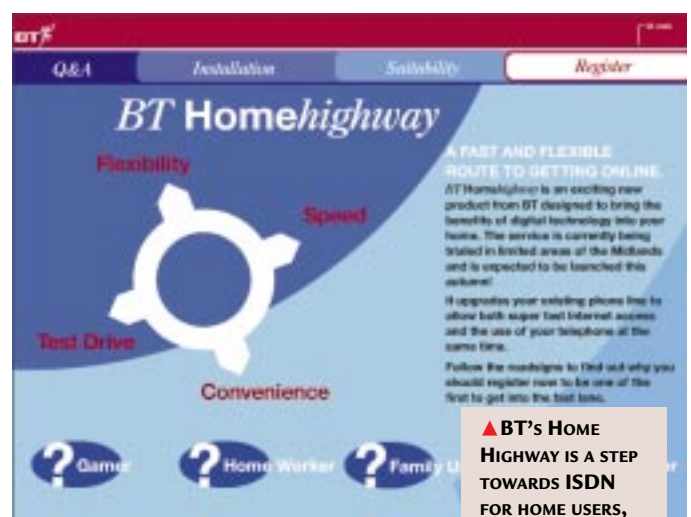
▲ **BT's Home Highway is a step towards ISDN for home users, but the pricing will still put many off**

also have heard about the pricing. If not, check out www.bt.com. Suffice it to say that the launch price isn't the dramatic leap towards affordable ISDN for which many people were hoping. In fact, it's not that much different from the pricing level of current ISDN services.

The significant difference is that you can also plug your existing telephones into the Home Highway box on the wall, and you'll be able to use network services such as dialling 1471 to find out who called you — though not on ISDN calls: that's still extra. From that point of view, it's a leap forward. And with a name like Home Highway, there's a better chance of BT actually realising people might have it installed in their homes — a point which previously, anyone who's ever tried to report a fault on an ISDN line and an ordinary line simultaneously, will realise is lost on BT. It's a shame that the pricing level isn't a similar leap forward on the part of BT. I would be interested to hear from any users who are thinking of switching to Home Highway.

☞ **On a more general note**, if you'd like to share your opinions on any of the aforementioned topics, please send them in. As ever, a personal response can't always be guaranteed, but feedback is always welcome. (See "*PCW* Contacts", page 254, for address details.)

Questions & answers

Q I have a web site, with a registration form. The important bit is as follows:

```
<FORM ACTION="mailto:someone@somewhere.co.uk" METHOD="POST">
<INPUT TYPE="hidden" NAME="Origin" VALUE="Romilly's H.F.B. Web Site">
```

Now, this works fine for many people who register — although some arrive with nothing in the text at all, and no attachment. And even at the best of times, my Eudora Light annoyingly puts the message into an attached file. I tried a test or two and it seems to work reasonably when I use Netscape as the browser, but not when I use Internet Explorer. Am I doing something wrong in my HTML? Or is there something wrong with my, and presumably other people's, IE3 setup?

a *The simple answer is that you're doing something wrong in your HTML. The "POST" action tells the browser that it should send all the contents of the form data back to the web server via the standard input channel. The action is the program that the browser will tell your server to run, and that program will receive the information input by the browser. However, your action field isn't a program on your server; it's a mailto URL instead, and only some browsers will spot that and launch an email program, because it's completely non-standard. And other browsers will be listing errors in the web server log, when the server can't find the program that the browser has asked them to run. You need to speak to the people who run your web server to find out*

what mail scripts are installed on it (most ISPs have a script that will perform this function). And if you run your own server, you'll have to find a script on the net, or roll your own. That's the only way to ensure that everyone can use the form, regardless of which browser they have.
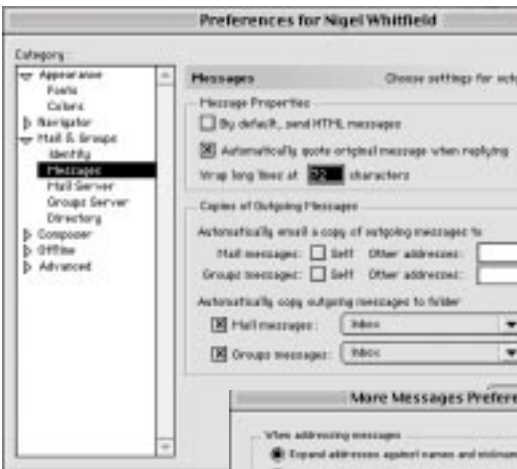
Q I've recently connected to the internet and use Outlook Express as my mail and news client. When writing mail I have the option to use plain or HTML format text. I would like to know whether the latter is readable by any email program, or does it need to be viewed with a web browser?

a *HTML email, while not quite the spawn of Satan, is one of the more irritating things to have afflicted the internet recently. While an increasing number of email programs can read HTML mail, it is by no means a majority, and a lot of people*

will see the raw HTML code in their inbox. Of course, they can save the message to a file and open it in a web browser, but frankly, I'd be more likely to delete a message than go to that trouble, and I expect most other people would, too. As a general rule of thumb, turn off features like HTML email,

unless you know that the person to whom you're writing has a program that can understand it. Particular contempt should be reserved for those mail programs that insist on sending two copies of your messages, one in HTML and another in plain text. While this means that most people can understand the messages, it more than doubles the size. Again, turn this option off unless you want to force people to spend twice as long downloading your messages as they need to.

▲ **NETSCAPE COMMUNICATOR ALLOWS YOU TO TURN OFF HTML MESSAGES, OR SAY IN THE ADDRESS BOOK WHO CAN RECEIVE THEM, RATHER THAN INFLICTING HTML ON EVERYONE TO WHOM YOU WRITE**

Some email programs allow you to specify who in your address book can receive HTML or other types of mail. If you want to communicate easily, that's certainly the best way to do it — and have the mail program send plain text to people who don't want HTML.

Q I'm using IE4.01 and have set up an FTP site with all our word documents, spreadsheets, images, etc. I also have a file viewer with a web viewing capability that will open and display all of these file types, and more. Unfortunately, clicking on the file name launches the native application within the browser. How can I have a different application association when using the browser to that used in Windows? I'm sure you used to be able to do this in IE3.02.

a *You used to be able to do this, but Explorer 4 is integrated with the operating system. Since it can be used as the desktop browser, it needs to use the same database as Windows to decide what happens when you click on an application. And this is, of course, a great leap forward and an enhancement of your user experience. But if you don't want your browser to be so tightly integrated with Windows, you'll need to revert to IE3 or install Netscape Navigator.*

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◄CALL ME A **CAB** – AUTOMATIC BACKUPS OF THE REGISTRY AND **INI** FILES
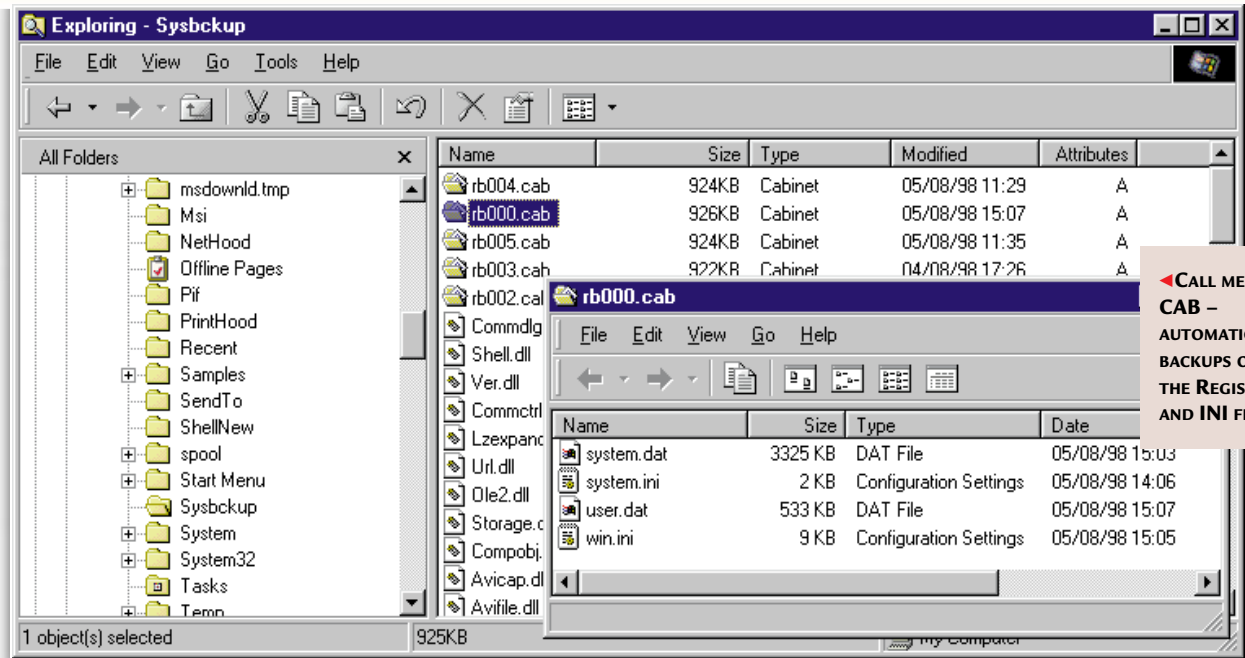
Beta blues

Tim Nott had cleaned up his PC act, installed Windows 98 from scratch and loaded Office 2000 beta. Great, but where had the configuration backup and emergency recovery utility gone?

Three exciting things happened this month. First, I decided to do something about my monstrous Windows 98 over Windows 98 beta, over Windows 95, plus various patches installation. So I bit the bullet, double-checked my emergency boot disks, backed up the bits and pieces I might need, and vapoured the rest. I then reinstalled a squeaky-clean Windows 98 from scratch. The second exciting thing (which rather undid the hygienic effects of the first) was to install the beta version of Office 2000. The third was to back up the Registry. Well, actually, it was the second, chronologically, for obvious reasons, but it makes a better story this way around.

Now you see them...

So I set off to look for those old stalwarts, the Configuration Backup and Emergency Recovery Utility. And there they weren't. A thorough search of the CD revealed no trace of Cfgback or Eru and, as far as the Windows 98 help files and Resource Kit were concerned, these un-programs had

been written out of history. Happily, however, I did find a replacement and although it's early days yet it does look rather good. It's to be found under the Tools menu of the System Information utility, which gets installed on the Start, Programs, Accessories, System Tools menu. If you can't face the seven mouse actions involved, create a shortcut to (or simply Run) Scanregw. Under Windows 95, each successful boot created a backup copy of the Registry files, System.dat and User.dat, with the extension .da0, the idea being that if your Registry became corrupted you could replace it with these last known good versions. What usually happened, though, was that your Registry would get corrupted in non-fatal stages, so that these backups were often equally useless. So, all prudent users would use one of the aforementioned utilities, or other manual methods, to create registry backups. But both utilities were flawed. Cfgback would let you make nine different backup versions, but you needed to be running Windows to restore them. Your life-jacket

is back at the airport, so to speak. Eru, on the other hand, though it backed up other vital files and could be restored from DOS, tried hard to persuade you to back up to a floppy disk which, as anyone with a fully-fledged Registry will realise, is somewhat inadequate, size-wise. And, no, it wouldn't span disks. It just left what it couldn't fit, not backed up.

Don't boot, back up!

Windows 98 seems to have addressed this mess quite well, as far as I can tell. Every day, rather than every boot, it backs up the Registry to the Windows\Sysbckup folder which, as with 95, contains spare copies of vital DLLs and so on in case the originals get copied over by third-party software. Both Registry .DAT files, Win.ini and System.ini get backed up to a CAB file. This has the same compressed format as the Windows installation CAB files, and you can View the contents and extract

I bit the bullet, backed up the bits and pieces I might need, and vapoured the rest

individual files from Explorer. By default, Windows maintains five copies, though you can alter this by editing the Scanreg.ini file. You can also opt to include extra files for backup, too. The other half of the package is the DOS-mode utility, Scanreg (without-a-w).

Questions & *answers*

Q When I create a new shortcut and type in a folder's name that contains a space, such as C:\My Documents, I am helpfully informed there is no such folder as C:\My. I've got SP1 installed. Is this a bug?

NICK LEE

a *Bug, Nick? Surely not. It's a feature — one that continues on into Windows 98. To stop this happening, enclose the target in double quotes, thus: "C:\My Documents". Alternatively, use drag-and-drop to create shortcuts.*

Q Every time I restart MS Exchange and Compose New Fax, the "Do you want a cover page" option is greyed, leaving me to trawl through Options, Select a Cover Page, Browse. I choose one, then it tells me that it is already in the list of available cover pages: do I want to overwrite it? I click yes, and all the cover pages suddenly appear as options. We are then OK until the next time I shut down, when I have to start all over again.

SARA BOURKE

a *It sounds crazy, but this happens when the Archive attribute has been removed from the .CPE files – for example by backup software. You can cure it by right-clicking on each one, choosing Properties and ticking the Archive attribute box. A more radical cure is available from a patch: navigate to the Knowledgebase on the Microsoft web site and search for COVERPG.EXE.*

Q With Active Desktop installed, the content of any Explorer window with detailed view selected becomes invisible except for file attributes. The number of items in the window is given correctly but I just can't see them. Any ideas, other than uninstalling the active desktop?

GORDON FEENEY

▲ **SO THAT'S WHERE THE COLUMNS WENT!**
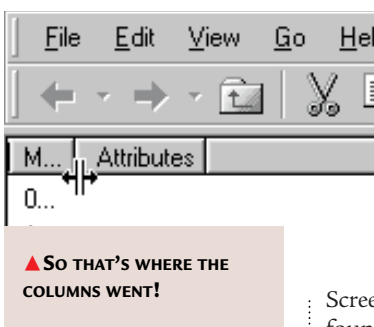
a *It's not drastic enough for uninstalling the active desktop. What has happened is that someone or something has messed with the columns. Move the cursor to the column headings (or in your case, heading) and move it to the left until it becomes two parallel vertical lines with an arrow sticking out each side. If you get just a double-headed arrow, you've gone to far. Drag this cursor to the right and you should see the first of the missing columns (Modified) revealed. Repeat to uncover the rest of the missing details.*

Q A while ago I noticed that my screensaver would not come on; after a while, the screen would just go blank. I checked the Properties-Screensaver dialog and found it set to None. After changing it back, I now find that whenever I reboot, the setting is reset to None. How can I return to having a screensaver as a default when I boot up?

MIKE CLAYTON

Q All the windows on a friend's PC have rather elegant title bars that "shade" from dark to light blue. Mine are boring old solid blue. How can I change them?

MARK HUTCHINSON

a *This, again, is a Windows 98 or IE4 enhancement. Right-click on the desktop and choose Properties (or go to Control Panel, Display), then click on the Appearance tab. Choose "Active title Bar" from the Item list, or simply click on the title bar in the sample picture and if you have this facility you'll see two "Color" buttons that control the start and end colours of the shading.*

▲ **MY EYES! MY EYES! ARTISTIC SHADING IN THE TITLE BAR**

a *Log in as the default user by restarting the PC and hitting the Cancel button when prompted for a name and password. You are now logged in as a "default" user. Set the screensaver, shut down Windows and you should find that this screensaver will now not only have "stuck" for all users, but that each user should be able to select their own, which will also be remembered.*

Q Where has Fax support disappeared to under Windows 98? I can't find it anywhere on my machine or install CD.

DAVE OLDCORN

a *Diligent research reveals that this is buried on the CD under tools\oldwin95\message \intl. You'll see a file called wms-fax.txt, which contains instructions on installing the fax software.*

▲ NO NYBBLING: THE EASY WAY TO HIDE DRIVES

[FIG 2]

The nybble table

HEX	BIN	HEX	BIN
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

If the Registry is found to be corrupt on starting, this will automatically replace it with the last known good version (pretty much as before). However, you also get the opportunity to run this manually and select which backup set you'd like to restore. As mentioned before, you can have more than the default five (up to 99, in fact) backups, and a command line switch with the Scanregw.exe can be used to add comments which become visible in DOS Scanreg. You can find out more from the General Troubleshooting chapter of the W98 Resource Kit.

But despite the improvements, there does seem to be something left on my wish list. The back-ups are replaced on a first-in, first-out basis and I'd really like to see a way of keeping key backups, such as "this is my original working Registry with just X, Y and Z installed" or "how it was before I installed Bloatware 6.0". The only way to do this seems to be to copy the CAB files elsewhere, then extract them (but not to the Windows folder), then restart in DOS mode, then copy them back over the existing .DAT files remembering to clear and set the Hidden, Read-only and System attributes.

I decided to install Visio 5 this month. Having got through the various options of what I wanted installed where, it then asked where I wanted the Start Menu shortcuts put. Declining the default choice, I told it to stick them in my

"Graphics" sub-menu, alongside the regular residents such as Paint Shop and about ten temporary guests which were taking part in a group test on which I was working. I ended up with a fulsome system of stacked menus encompassing shortcuts to all the Visio templates one could ever possibly need. And not a trace of any of the original shortcuts, which had disappeared beyond the reach of the Recycle Bin or even DOS mode undelete. So, if you install this fine product, be warned — don't specify an existing Start Menu folder.

Thanks to Sam Edge, Dave Johnson and Graham Mayor, who pointed out, *vis-à-vis* September's column, that there is another way of loading CONFIG.SYS devices for MS-DOS mode. To recap briefly, if you want to use, say, a CD-ROM drive in real-mode MS-DOS rather than a windowed DOS session, you have to specify new CONFIG.SYS and AUTOEXEC.BAT commands in the relevant PIF. However, there is a utility that lets you load CONFIG.SYS entries from a batch file. Hence, you can load both components of the CD-ROM drivers from DOSSTART.BAT, saving considerable restart time. It's called DLOAD.COM and comes with SoundBlaster cards. ftp://ftp.creaf.com/pub/creative/patches/ctload.exe.

Remember I wrote in last month's Q&A section about using TweakUI to hide drives and how this was related to a Registry setting? I wrote that "no doubt some bright spark will write in to tell us how the other drives are calculated." Well, just to recap, the setting is at `HKEY_CURRENT_USER\Software\ Microsoft\Windows\ CurrentVersion\Policies\ Explorer`

It's a binary value labelled Nodrives, which defaults to 00 00 00 00 hex — in other words, all drives are visible. And the bright spark who actually got in before the column was published, as we were discussing related matters, was Peter McGarvey, upon whose anorak may the sun never set. To see how the mask works:

1 WRITE DOWN the drive letters in reverse order, separated into four groups, with the first group containing six leading "padding" characters.

2 ASSIGN a 1 to each drive to be hidden, and a zero to each one to be visible. You should get four binary bytes.

3 WRITE the hex code of each byte below. You should end up with something like [Fig 1]. If, like me, you can't do this in your head and find it equally painful using the Windows calculator, use the nybble table in Fig 2 to translate each half-byte. Then reverse the order of the bytes and this will be the value that appears in the Registry. So, 8e 7f ff 03 will hide all but drives A,E,F,G. And P. 04 00 00 00, as reported last month, just hides the C: drive.

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Hidden gems

Roger Gann explores the undocumented options, features and useful shortcuts lurking in DOS.

Back in those dim and distant days when you were supplied with proper, decent manuals when you bought software, MS-DOS was accompanied by a 300-page user guide. By contrast, Windows 98, an infinitely more complicated operating system, comes with a sylph-like "Getting Started" manual which weighs in at a mere 130 pages or so. However, as we all know, size isn't everything, and despite the thoroughness of the old MS-DOS User Guide, it doesn't tell us about the world's most popular operating system. It omitted to describe certain DOS commands that Microsoft has chosen to keep schtumm about. This should come as no real surprise, because there can be few apps written that don't have at least some undocumented features. And because these DOS commands are undocumented, they don't officially exist. Microsoft maintains they are "experimental" and won't guarantee to

Many of these features hark back many years, to ancient versions of MS-DOS

maintain them from one release of DOS to another. Because of this, Microsoft conservatively recommends that you stick to the tried and tested (i.e. documented) bits of DOS and that you ignore the undocumented stuff.

In common with most other users, I find these secret DOS features intriguing. I've tracked down over a dozen of these DOS secrets for you to try and to decide for yourself, some well-known, others less so. Most are fairly trivial, it has to be said, but one or two are quite useful. Surprisingly, many of these features hark back many years, to ancient versions of MS-DOS; but many, however, still work under Windows 98! So explore away. Don't forget that because they are unsupported by Microsoft, not every version of MS-DOS will feature them.

☛ **Format /Autotest and /Backup**
These little gems first surfaced way back with MS-DOS 4.x. They allow you to format floppies with minimal hassle. Simply enter:

`FORMAT A:  /AUTOTEST <CR>`

This option begins reading and formatting the disk contained in the A: drive — at default capacity —without further user input. When the formatting is complete, it returns you straight to DOS. To format another disk, simply press F3, which restores the contents of the previous command line to the current one, and press Return. This command switch is a real time-saver: using the standard Windows 98 format routine, it took me 115 seconds to format a floppy disk. But by using the /AUTOTEST switch in a DOS box, the time dropped to 50 seconds. And you don't have to keep hitting the Enter key, either. Make up a batch file with this command in it, and then make a shortcut to it on your desktop. Cool or what? If you format a disk with a rated capacity less than the full capacity of the drive, say a 720Kb disk in a 1.44Mb drive, specify the disk's formatted size with a /F switch. This command formats a 720K floppy in a 1.44Mb drive: for example,

`FORMAT A: /AUTOTEST / F:720 <CR>`

If you want the same simple formatting routine but also want to give the disk a label, use this switch:

`FORMAT A: /BACKUP <CR>`

When the format is over, you may enter a volume label of up to 11 characters. When you press Enter, FORMAT provides a listing of the disk size, the space available, and the size and number of allocation units. Both these switches can be used with other FORMAT switches, such as /U and /S, though not with the quick format switch, /Q.

☛ **Command /F**
This is an odd one. The DOS command-line interpreter, COMMAND.COM, accepts a variety of switches, such as /P and /E, to modify its behaviour and you can see them all if you simply enter COMMAND /? . However, this list isn't exhaustive: there's another, /F. If you add

this switch after COMMAND.COM in your SHELL statement in CONFIG.SYS, then whenever DOS's critical error handler is triggered, the action in question will fail. For instance, if you wanted to copy a file onto a duff floppy, DOS would give you an "Abort, Retry, Fail?" error message. With the /F switch, DOS automatically selects Fail for you, as though you had typed "F" yourself.

☞ FDISK /MBR

This undocumented switch concerns the MS-DOS partitioning utility, FDISK, something most users won't have to use too often. By adding the /MBR switch, the Master Boot Record — as Microsoft calls the boot and partition tracks — is rewritten, without touching the partition table. The MBR is located in the first sector on a hard disk. Microsoft left the /MBR switch undocumented for a reason: some programs, such as multiple-boot programs, modify the master boot record for legitimate reasons. Typing FDISK /MBR erases the changes that these programs have made. Don't use this command if you use programs that need to modify the master boot record. For example, many users with large hard disks will use special overlay software to make sure the full capacity of the drive is available. These programs modify the Master Boot Record, and if you use this switch, the MBR will be reset to its original state and your hard disk will then "disappear". Dual-boot programs will also be zapped in this way.

Getting Stoned

As well as being useful in times of disk crisis, this FDISK switch is also a great way of despatching boot sector viruses — the most common viruses — such as Joshi, Stoned, and Michelangelo. These hide themselves in a tiny bit of executable "bootstrap" code located in the boot sector. It's this bit of code that reads the operating system in to memory. The /MBR switch makes FDISK rewrite this code, erasing any viruses hiding there in the process. Just boot from a known, write-protected system floppy and enter:

`FDISK /MBR <CR>`

Note that FDISK /MBR will only eradicate the viral code in the master boot record. Nor will it fix the master partition table if it has been disabled by a virus. If this has happened, rather than repartitioning the disk — and zapping its contents in the
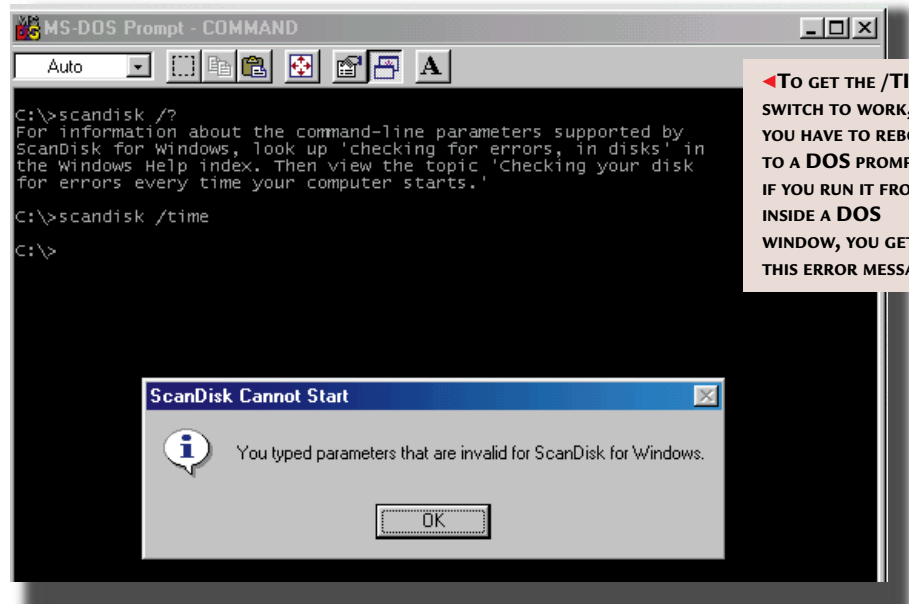
process — employ a little-used switch that accompanies the old MIRROR command. MIRROR appeared on MS-DOS 5.0 but sadly disappeared from MS-DOS 6.2. But it is still available, on the MS-DOS 6.2 Supplemental Disk. Check your install disks to see if you still have this version of DOS. If you type:

`MIRROR /PARTN <CR>`

DOS creates PARTNSAV.FIL on a floppy disk. The file contains a copy of all your hard disk's partition tables. For convenience, keep the backup copy on a bootable floppy. If the partition data ever becomes corrupted — the DOS may refuse to recognise one or more logical drives on the hard disk — pop in the floppy containing the backup file and type:

`UNFORMAT /PARTN <CR>`

UNFORMAT, started with the /PARTN switch, restores the partition tables from the information in PARTNSAV.FIL. If the partition tables were the only part of the disk corrupted, it should be as good as new again.

☞ SCANDISK /TIME

SCANDISK is the disk media-testing tool introduced with MS-DOS 6.2 to deal with iffy hard disks. It has a number of command switches, but one not listed is /TIME. In its default mode, SCANDISK will read and write to each sector on the hard disk. Any sectors that it has trouble writing to or reading from are marked as "unusable" after the data it contains has been removed to a safe spot. It's not

entirely clear, but it seems that the /TIME switch makes SCANDISK more sensitive and can mark as bad any sectors it has any trouble reading/writing. Normally, if DOS has trouble reading a sector, it will re-try a number of times and sometimes it is successful. This is noticeable on floppies where you can hear the head tracking back and forth over a sector. But a sector that DOS has trouble accessing might be on its way out. SCANDISK will

This FDISK switch is a great way of despatching boot sector viruses like Michaelangelo

only deal with sectors that have already gone bad; with the /TIME switch it can deal with those that are on the slippery slope and nip any problems in the bud, before they get any worse. It does this by timing how long it takes for the drive head to access the sector, and any that take too long are candidates for attention. To get it to run under Windows 9x, boot to an MS-DOS prompt first, otherwise the DOS version of ScanDisk won't run.

That's enough secrets until next month's column. If you know of any undocumented options or features, do drop me a line.

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◀**To get the /TIME switch to work, you have to reboot to a DOS prompt. If you run it from inside a DOS window, you get this error message**

Getting in step

Multiple processors can mess up your system. Andrew Ward takes steps to ensure a full recovery.

Laurens Leurs writes from Belgium following on from the various items on the subject of multiprocessor systems, to report that a while ago his company installed a dual-processor 200MHz Pentium Pro system which gave repeated problems with blue screens and applications failing to shut down properly. Only after replacing virtually everything within the system did the vendor suggest checking the processor steppings and, unsurprisingly, they were different. After replacing the processors with two of the same steppings, the system worked fine. So, this provides us with firm evidence that ensuring the steppings are the same in multiple-processor systems isn't just an old wives tale, but sound advice from Intel.

Home run

Andrew Foulsham has written in about home directories. If you follow the recommended procedure of setting up a single share to a directory called USERS (or similar), and then create individual home directories beneath that, there are two problems. The first is that users will see a long list of other directories, which is harmless but unnecessarily confusing. If the permissions are set correctly, they can't access them, but they can still see them.

The second problem is that the default directory that people log into is not their home directory, but the level above (USERS or whatever you've called it). Applications thus can't be configured to automatically use whatever you've chosen as the network drive letter — Z: is the usual choice — as the data directory, since Z: would point to USERS rather than to the individual directory.

A third but less severe problem is that home directories created automatically have security permissions

◄ **CHECKING YOUR PROCESSOR STEPPING WITH WINMSD.EXE**
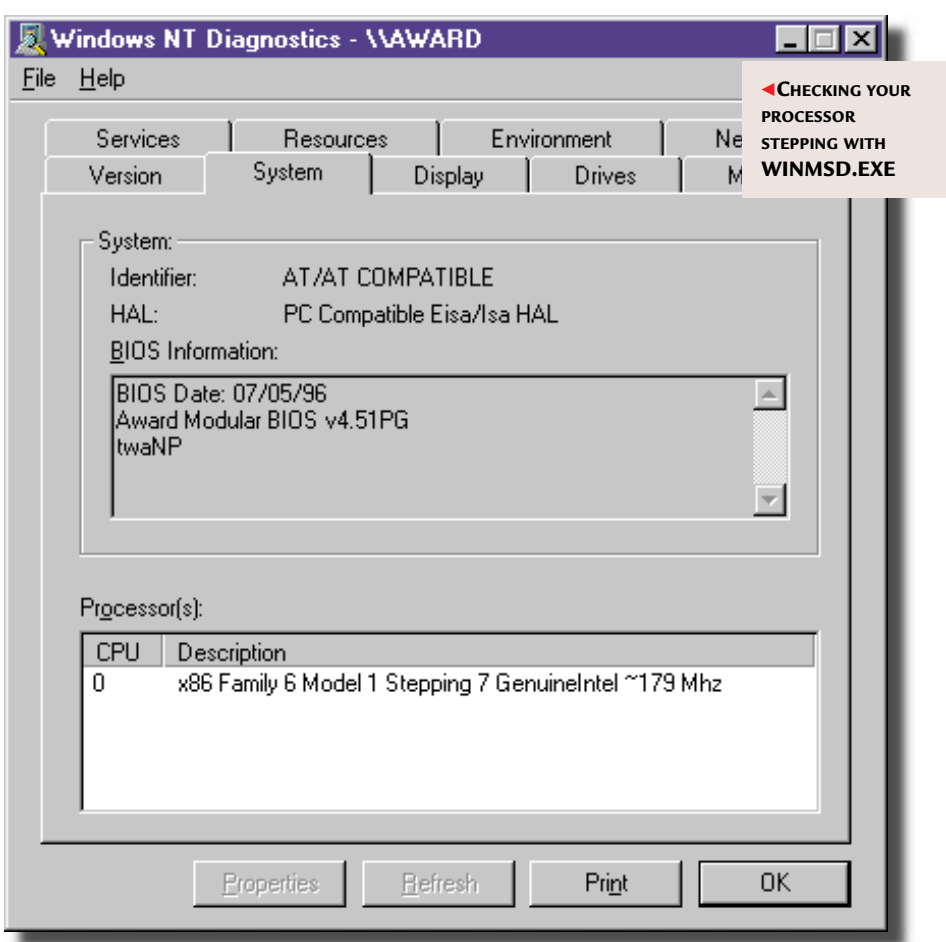
set such that only the creator-owner (the user) has access. One implication of this is that an administrator can't

> ### One implication is that an administrator can't even look to see who's responsible for the disappearing server disk space

even look to see who's responsible for the rapidly disappearing server disk space, for example. A workaround is to look at the backup logs. One thing is certain — there are no easy answers. If, for example, you want Z: to be the home directory, you need to create a lot of shares, which is an administrative headache, to say the least. But you can solve the first problem, and hide the

shares from appearing in a browse list, by appending a dollar sign when you create the shares (thus creating them as

`\\server\%username%$)`

Depending on the permissions you set when you create the shares, you can solve the third problem too, and allow administrators access. Which method you choose entirely depends on your willingness to accept the administrative burden of creating and maintaining all those shares.

Giving NT the boot

There appears to be some confusion over whether it's possible to boot Windows NT from the new high-capacity 120Mb LS-120 floppy drives. Bill Jones hasn't been able to get it to

RESCUE ME! NT : Directory Information

Changes Starting:
28/07/1998 13:01:34 (Initial Configuration)

Changes Ending:
Now

D:\WINNT

–	PNEN3250.DLL	03/07/1998 17:55:42	318976
–	PNUI3250.DLL	03/07/1998 17:55:42	604160
	quartz.dll	16/01/1998 18:42:44	731920
	quartz.dll	08/04/1998 16:03:46	743184
	quartz.vxd	16/01/1998 18:42:44	5672
	quartz.vxd	22/03/1998 13:50:02	5672
–	RAOCX32.DLL	03/07/1998 17:55:44	62976
–	RAXTRA.X32	03/07/1998 17:55:44	20992
+	strmdll.dll	30/06/1998 09:00:04	217984
–	SWFF3250.DLL	03/07/1998 17:55:42	21504

<< >>

☑ **Show Only Changed Lines**

Go to the next added, deleted or changed line.

Exit Snapshot Manage Report Profile Restore Undo Help

◄**IF YOUR REGISTRY GETS TRASHED, RESCUE ME! CAN RESTORE AN EARLIER VERSION**

readme.txt on the Windows NT CD-ROM gives further information on installation and possible problems. One apparently improbable effect is that you see the message "Windows NT did not find any modems attached to your computer" when you try to detect a modem in the Remote Access Service (RAS) setup, or "Cannot load the Remote Access Connection Manager service" when trying to start the Remote Access Connection Manager service or Dial-up Networking. Furthermore, you may find that if you try to open the Modem Control Panel, nothing happens. These are due to having the Plug and Play service installed, but stopped or disabled. The answer is to go into the Control Panel and click Services, select the Plug and Play service, and change the Startup mode to automatic.

work on an HP Vectra 7 system. Well, the best information I can find is that you can only expect to boot from one of these drives if your system BIOS specifically offers it as a boot device. Usually, such a BIOS would also be able to boot from CD-ROM and perhaps even the network. Simply replacing the floppy drive with a LS-120 drive and installing the appropriate controller doesn't appear to be enough. If anyone can throw any further light on this subject, it would be very much appreciated.

Plug and pray

Mark Ovens points out that contrary to popular opinion, Windows NT 4.0 does indeed support Plug and Play ISA devices. If you remember, Plug and Play was a stopgap measure to overcome the problem of configuring adapter cards that was adopted before PCI became widely available. In theory, Windows NT 4.0 doesn't support Plug and Play, but Windows 95 and 98 do. In fact, if you hunt around on the Windows NT 4.0 CD-ROM, then in \drvlib\pnpisa\x86 you'll find two files, pnpisa.inf and

pnpisa.sys. This driver really can be pretty useful, because there's no other way to install certain Plug and Play sound cards and internal modem cards. According to Microsoft, this Plug and Play enabler "may allow the detection and installation of Plug and Play devices in Windows NT 4.0". To install it, right-click the pnpisa.inf file, select Install on

Plug and Play isn't officially supported by Microsoft, so if you choose to use it, you're on your own — literally

the menu that appears, and then restart your computer. After you restart, "you may receive a message that Windows NT has detected your Plug and Play device(s)," says Microsoft.

There are a few potential problems with the Plug and Play driver. The first is that it isn't officially supported by Microsoft, so if you choose to use it, you're on your own — literally. It really is a case of Plug and Pray. The file \drvlib\audio\sbpnp\

Rescue Me!

Following a system crash, John MacLoed now has an empty Hardware Profiles description line. Although there's a knowledge-based article on this subject (Q155974), it hasn't solved the problem for him. I can't tell him how to fix it, but I can suggest a tool that can be of help in restoring corrupt registries and other system problems. **Rescue Me! NT** is one of those programs that keeps tabs on your system configuration so that if anything should go wrong — most often, this happens when you install a dodgy piece of software — you can wind back to a working configuration. Rescue Me! tracks changes to the configuration files, the registry, the Windows directory and even drive mappings. Certain specific files, directories and registry keys are monitored by default, and you can add additional ones to the list if they're important in the context of your system. You can take a system snapshot at any time, and typically would do so just prior to installing a piece of new

software. The default installation takes a snapshot each time Windows starts — or more accurately, each time you log on — and you can schedule regular snapshots, perhaps once a day, or once a week. Beware, however, that there is an adjustable figure for the maximum number of snapshots you can take. And if you take snapshots too frequently, you might quickly reach this number, and the one you want to go back to will drop off the end. But bear in mind that each snapshot can potentially take up a lot of space: it may be only 1K on a Windows 3.1x system, but it's more like 8Mb on NT. Yes, that's right: keep ten snapshots, and you're consuming 80Mb of hard-drive space.

The differences between any two snapshots, or between any one snapshot and the current configuration, are readily viewable. Rescue Me! will show you exactly which registry keys and files have been added, removed and changed. It's also possible to display or print a full report, although unfortunately, in the version I tried (4.01.10), producing a report of drive configuration changes caused Rescue Me! to crash, following the removal of a network drive.

Rescue Me! is a bit strange all round; the documentation doesn't quite match

Rescue Me! will show you exactly which registry keys and files have been added, removed and changed

the program, and the installation routine is very outdated — it doesn't allow you to browse to a desired install directory, and doesn't like long directory names or ones with spaces in them. Furthermore, it doesn't appear on the task bar when running. It appears to be a rebadged version of ConfigSafe. Nevertheless, it does seem to do the job.

One feature not covered by the documentation is the ability to create

your own profiles. When a snapshot is taken, it is for a specific profile — and the profile specifies which registry keys, files and directories are monitored. For example, you might want to create a profile that just tracks registry changes, or just changes to the Windows directory. If a problem with your system does occur, perhaps due to installation of a new piece of software, you can use Rescue Me! to restore an earlier system configuration. If that actually makes

DISAPPEARING FILENAMES

A few people have written in over the months to report disappearing filenames in Explorer. Dr William Boaden describes the effect thus: **"When I double-click on a filename to edit or rename it, the filename vanishes. The icon is still there and, in fact, you can still edit the filename —without seeing it. One more click and it returns."** Whenever readers have reported this problem, I've suggested that it might be a video driver problem, but further research by Dr Boaden has unearthed the real cause. It's actually nothing to do with the video card or driver at all. Apparently, the problem relates to the Iomega Zip drive (what, again?) and is caused by the Iomega Icons application in the startup group. This leaves the process imgicon.exe running, and ending this manually — or better still, taking the program out of the startup group entirely — cures the phantom disappearing filenames. Thanks for that most useful information, Dr Boaden.

things worse, you can undo the restoration — but there is only a single level of undo offered. Rescue Me! will restore registry information and configuration files, but won't replace files (such as DLLs) that were removed or changed during software installation. Rescue Me! costs around £50 and is available from major retailers such as PC World, as well as software resellers like Software Warehouse and Action.

■ **Andrew Foulsham** takes me to task for repeating the official advice that hardware mirroring should be used for best security on the boot device. His experiences with an Adaptec RAID controller for the system partition were, he says, fraught. In fact, every time he attempted to set it up in hardware (on a Siemens Nixdorf Scenic Pro with Adaptec AAA-133 controller), the system would crash after half an hour. After the usual hassles of changing every bit of hardware in sight — and haven't we all done that — and loading on the latest service pack, drivers and updates, the problem still wasn't cured. Andrew has decided that any loss in performance and security by having a single boot device is more than made up for by the gain in reliability and availability.

■ **A common complaint** is the length of time it takes to shut down systems running NT. This is especially true of servers running Microsoft Exchange. Reports of many minutes are common. One way to speed the process is to manually stop the Exchange services running, and there are two ways of doing this. One is via the Services control panel. Select the Microsoft Exchange System Attendant service and stop it. You'll be asked if you also want to stop several other services that are dependent on it — of course, say yes. The other way is via the command line, using the net stop command. In theory, you can just stop the System Attendant service and this will cause the other services to stop too, but this isn't reliable. It's better to create a batch file to stop all the services one by one, as follows:
☛ net stop "microsoft exchange Internet mail service"
☛ net stop "microsoft exchange information store"
☛ net stop "microsoft exchange message transfer agent"
☛ net stop "microsoft exchange directory"
☛ net stop "microsoft exchange system attendant"

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All mapped out

Mark Whitehorn puts you on the right road to GPS systems and mapping software to use with your PDA, and ponders PDA/PC connectivity.

I love my Psion 5, I really do. I have to keep writing that because I keep on complaining about the poor thing in this column, and that makes me feel mean. I suspect the very fact that it approaches perfection makes me rage at the bits that work less than optimally.

My current moan traces its origins back to the Psion 3 — and yes, I still have one and it still works. The PC connectivity software for version 3 was DD (DOS-based and dreadful). The main problem lay in the unreliability of the connection. I would optimistically plug the £70 cable into the Psion and the PC, then fire up the software. After the connection failed I would spend a happy half-hour restarting PC and Psion in different orders until a connection magically appeared. When and how a connection actually appeared seemed to be on a wing and a prayer.

Over the years I have moved up through the Psion range, changed to PsiWin in its various guises, and also changed PC and Windows version multiple times. Despite all these changes, I swear that the same problem still haunts me. As a matter of course, I expect to spend time restarting machines if I want the Psion to talk to the PC. The net result is that I back up the Psion less frequently than is wise.

To their credit, though, Psions are so stable that I have never lost data from a system or application crash. The only time I *have* lost data was a regrettable incident that involved a Psion 3, a concrete floor and gravity. The bits (physical) that I recovered couldn't be reassembled into bytes (data). Ultimately, I talked to the people at Psion, who suggested some fixes:

Psions are so stable that I have never lost data from a system or application crash

◄**FIG 1** IF YOU ARE HAVING INTERMITTENT CONNECTIVITY PROBLEMS, TRY THESE SETTINGS. BUT FIRST, OF COURSE, FIND OUT WHICH **COM** PORT THE **PSION** IS USING! IF THIS STILL FAILS, TRY DUMBING DOWN THE BAUD RATE — ONCE AGAIN, MAKE SURE THAT THE **PSION** IS USING THE SAME SETTING

☛ **Disabling** the auto com-port detection and auto-baud-rate facility [Fig 1].
☛ **If you are** also using Windows CE services and getting this problem, remove CE Services and PsiWin. Then re-install PsiWin followed by CE Services.

I tried both the above fixes and the problem is still there. They may help you, though, so if the problem sounds familiar, try them. The people at Psion also told me that this is an isolated incident, but although I like and trust them, I have also become sick of watching cables waggling ineffectively in the air [Fig 2]. So, let's do a test: if you have experienced similar problems, email me and I'll forward the lot to Psion. Remember that problems with earlier versions of PsiWin are now water under the bridge and that other problems with PsiWin don't count, so the questions are quite specific:

1. Do you currently use PsiWin 2.1 to connect a Psion to a PC?
2. Do you experience the same kind of problems that I have described,

establishing a connection?
3. Have you tried the above fixes?
If the answer to *all* the above is an honest "yes", send me a blank email with the header "Me Too!". If the answer to question 2 is "no", then send me a blank email with the header "Well, it works for me!" I'll report back

▲**FIG 2** THIS IS HOW THE PROBLEM APPEARS ON SCREEN

either way, and if it turns out that I am a voice crying in the wilderness, I'll apologise and stop bothering Psion's helpline.

GPS on the map

I said I'd have a look at PDAs and GPS (Global Positioning System) in this month's column. Even now, several years after the first implementations became available, I still think that the most exciting thing you can do with a handheld is to have a moving map on it. The PDA supplies the map, a GPS unit supplies your position, and you're in

business. For reasons outlined in the "Garmin" box out (*p270*), the need to tie the two together has essentially disappeared. But PDAs aren't just about need, they are also about fun. And this, in my book at least, is still serious fun.

A GPS unit looks like a portable phone with a small LCD and a selection of buttons but no number pad. The Americans have put a number of satellites in orbit around the Earth, taking paths which ensure that at least three of them are visible from any point on the Earth's surface, at any time. When you turn on the GPS unit, it takes a little time to acquire signals from the satellites in the sky above it. The unit then interprets these signals and triangulates its own position on the ground to within 50m or so. The accuracy could be much greater, but the Americans cause the signal to wobble in order to confuse the enemy — good thinking, as I for one will feel grateful when a thermonuclear device misses me by just 50m. (Currently, right-thinking people are trying to dissuade the US government from this paranoid view.)

For the technically minded, detailed information about the GPS satellites is available from www.garmin.com. Given this piece of kit (that knows exactly where it's at) and a cable to relay the information to your handheld, all you need is software to interpret the data. This is available in several flavours.

☞ **Mapping software and GIS**
Mapping software has been available for PDAs for years and, with GPS support, for about the last three years. The GPS extras allow a pointer to be placed on the map that will move to track the

movement of the GPS unit. Take a cross-country ramble and it follows your every step. In fact, mapping software is a broad church. There is software that displays maps, there is software that can be used for route planning, and then there are GISes (Geographical Information Systems). GISes are best at "displaying large amounts of pre-supplied geographical data (i.e. where things are) in a useful form," to quote Steve Litchfield, author of Psi-Mapper.

☞ **Software**
The first GPS-aware application I used was Psi-Mapper. It was, and still is, great. Psi-Mapper/GB and Psi-Mapper/France were mentioned briefly in last month's column; see Steve Litchfield's web site at 3lib.ukonline.co.uk for more details. The most recent version of **Mapper** (version 6) for the Psion 5 will not have GPS support due to problems with OPL/32 and serial-port communications. However, the version of Mapper for the 3a/c does have GPS support. Despite its name, Mapper displays relatively minimal road information (motorways and primary routes) and has no route-planning abilities. Its strength lies in the GIS component. A host of overlays (aircraft crash sites, Little Chefs, etc) are available on Steve's web site. The reason for the huge number of different "overlays", as they are called, is simple. Steve has made it easy (and free) for people to develop their own and then place them in the public domain.
AutoRoute, a PC program that migrated successfully to the Psion 3a/c platform, was another good mapping program. It has better maps than Mapper but no GIS. GPS support was eagerly awaited, but Microsoft acquired the application and immediately announced that there would be no further development of the Psion version

TIPS AND TRICKS

☞ **Check your GPS output**
Reader Steve Litchfield suggests that the best way to check what your GPS is outputting is to install the "Comms" app on your Psion (you'll find it on the C drive). Set the parameters to 4,800 baud, 8 bits, no parity, no handshaking, and see what appears on your screen.

☞ **Pocket Universe**
Another reader, who signs himself as "John", writes: "Ever been out at night and wondered what a particular constellation was called? Or tried to work out where the planets are in the sky? Or maybe even tried to find the Andromeda Galaxy? Well, Pocket Universe is available for Windows CE and there are full details and a demo at www.sticky.net."
I've had a look at this web site and it is impressive. If you're a star-gazer, check it out.
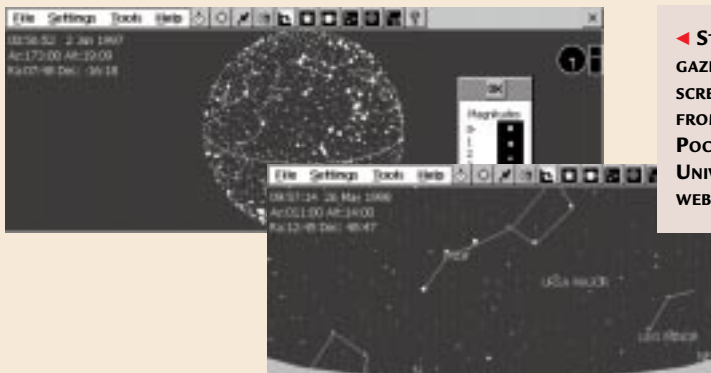
◄ **STAR GAZING: SCREENSHOTS FROM THE POCKET UNIVERSE WEB SITE**

— so that was that. Happily, Mike Rudin produced the impressive AutoGPS that adds GPS functionality to AutoRoute 1.0. So those of you who bought AutoRoute can actually play GPS. Then there's **Route Planner**, the software formerly known as En Route. This is essentially map and route-planning software for the Psion 5 and does support GPS. Try www.palmtop.nl/enroute5.html for more information. Other applications with GPS support are becoming available; there will be a review of London Access from Dynamic Systems Research info@dynamical.com in next month's column. I'll also cover general mapping software on PDAs other than Psions.

Sync or swim

Occasionally I get spookily-similar emails arriving almost simultaneously. Consider these two as an example. Reader, Dr Simon Rollins, Simon.Rollins@ emballage.boxmore.com, writes: "As an owner/user of neither a Psion nor Windows CE, but wishing to part with some hard-earned cash, I have lots of questions but no answers. Perhaps you and my fellow readers will be able to help recollect their own experiences?

"My main machine is a Dell portable with French keyboard, software etc. I use Microsoft Outlook 97, also French, as are my diary/contacts list/email system, to-do lists among the Office 97 suite. I am looking for a handheld that can seamlessly integrate with my portable's Outlook 97 and which automatically remains in synchronisation. Which of the systems currently on the market do you consider to be best adapted to my needs, and why?"

Simon's email was closely followed by one from Phil Mayhall, phil@bradworthy .prestel.co.uk, who wrote: "The Psion box's advertising and documentation claims 'synchronisation with Outlook 97 and Organiser 97' — and this was one of the reasons I got the Psion. In general, it works, except, suppose I were a doctor. I keep contact (patient) data in Outlook or Organiser (the problem seems to be generic). Usually, this is stuff like name, phone, fax, first contact date, and a note containing personal details (e.g.

A NEW LAUNCH FOR GARMIN

GPS III

Garmin has recently launched the GPS III which, according to the makers, "includes millions of miles of highways, interstates, railroads, rivers and shorelines to show you just where you stand". Essentially, there are two flavours of GPS III: the Americas version (North & South America) and the International version (rest of the world). Both versions show coastlines, motorways, A-roads and towns with >70,000 souls. (In places like Africa, where large towns are rare, this can drop to towns with >3,000 souls.) The Americas version shows all of this, as well as street maps for some of the big cities.

In general, this "bundling" of mapping software inside GPSes will only increase. Either that, or PDAs may soon come with GPS technology built-in. Either way, the days of needing a bit of wet string between the two are coming to an end. (but it's still fun to do!).

tendency to violence, drug prescriptions or any other relevant information). "Synchronisation loses all the note (memo) data and this loss occurs in both directions." This is not synchronisation as I understand the word, and I wonder whether it is a Trades Description Act violation? I emailed Psion for help and they said that synchronisation of memo fields is not supported — find that in any of the documentation if you can.

The claims made by some manufacturers may, in some cases, not match reality

Both of these emails are longer than the extracts I have presented here so I have included both as text files on our free CD-ROM. Isn't that coincidental? One email from a doctor about a specific problem, and then a reply from someone else which not only addresses the same problem, but also uses the example "suppose I were a doctor".

This whole area of synchronisation between PDAs and PC-based organisers is worth examining, since I get the feeling that it is something we are all keen to do. In addition, the claims made by some manufacturers may, in some cases, not match reality. So, I'd be grateful for email on the subject. Emails along the lines of "product X is rubbish" are satisfying to send but less helpful to other people. What would be great are emails like Phil's which identify a problem and provide a possible workaround.

Cron, the time daemon

Suddenly, your system freezes… you try all the tricks you know, but still you can't free it up. It happened to Chris Bidmead, and here, he shows you how to unravel the dark secrets of Crond.

A couple of months ago I was in the middle of some work with Gimp — see www.gimp.org for a real treat if you don't know about this stunning, free graphics package — on the IBM PC315. Suddenly, the whole system ground to a halt. This was particularly alarming because the PC315, with its 200MHz Pentium Pro, is one of the mightiest machines on my modest network.

I tried to shift from my X screen into a virtual terminal to investigate what was going on, but there weren't enough spare cycles on the system even to do this, and none to allow me to open an xterm from which to start killing a few processes; to all intents and purposes, the system was locked up. If you're on a network, the other thing to try in a situation like this is telnetting in from another machine. But running the telnet daemon also needs machine cycles, so I was stuck.

A glance at the computer's fascia showed me that some sort of frenetic drive activity was in progress. It was a few minutes past midnight and I guessed what was going on. The system had decided to start doing some housekeeping. Unfortunately, it had chosen a time when user memory (including swap memory) was very low, most of it having been taken up with Gimp and its data: hard-drive housekeeping, when there is no spare memory, will freeze out everything else.

Crond memories

Automated processes are the responsibility of the "time daemon" crond, usually referred to as just "cron". It runs all the time, and checks its configuration files every minute to see if there is work to do. The location of these config files depends on the system you are running. At the time, I had RedHat 5.0 on the IBM PC315, and the vixie-cron this uses — named after its author, the great

free-software guru, Paul Vixie — checks in /var/spool/cron for various cron configuration files named after each user. The crontab utility manages these "user" cron files — where "user" can be *bidmead* or *daemon* or *news* or any of the users listed in /etc/passwd — which allows you to inspect and edit the cron entries. Vixie-cron additionally implements an older convention, of running the commands set up in /etc/crontab. This is

It was a few minutes past midnight and I guessed what was going on…

the system cron file, which is unrelated to any particular user. For the structure of these cron files, see man 5 crontab (as opposed to just man crontab) which tells

you about the crontab utility itself. If you're not familiar with the man manual utility, this can be confusing. Essentially, the man pages are divided into numbered sections dealing with different aspects of the system. If you supply a section number, you get the entry in that section; if you don't, you get the first entry that man finds. This version of RedHat has /etc/crontab set up periodically to run scripts that are in the /etc/cron.<period> directories, where <period> is either hourly, daily, monthly or weekly. This is a convenience, not a fundamental change to how cron works. But it means that instead of having to mess with /etc/crontab or the /var/spool/cron files, you just put a script that you want to run, say, hourly into /etc/cron.hourly. I searched through /etc/crontab for the script that had

GEEK-GIRLS (AND BOYS) IN CLASS

I get a lot of mail asking basic Unix questions, most of which I answer directly rather than recycling them through this column. A useful site is the Unix reference desk at www.geek-girl.com/unix.html (not just for girls).

☛ Sean Tohill sean@westminster. ac.uk tells me that the University of Westminster is offering **Unix evening classes for beginners**, and also covers subjects like TCP/IP, web-site development, C and Java programming. Sean has been organising some of the courses, and suggests that you email him if you want to know more.

▶ THE GEEK-GIRL SITE CONTAINS REFERENCES TO MATERIAL GATHERED FROM MANY DIFFERENT SOURCES IN THE UNIX COMPUTING ENVIRONMENT, DIVIDED INTO 11 CLASSES, FROM 'GENERAL' TO 'SUN SYSTEMS' TO 'SECURITY', AND THERE'S EVEN ONE ENTITLED 'HUMOUR'!

The Linux desktop stakes
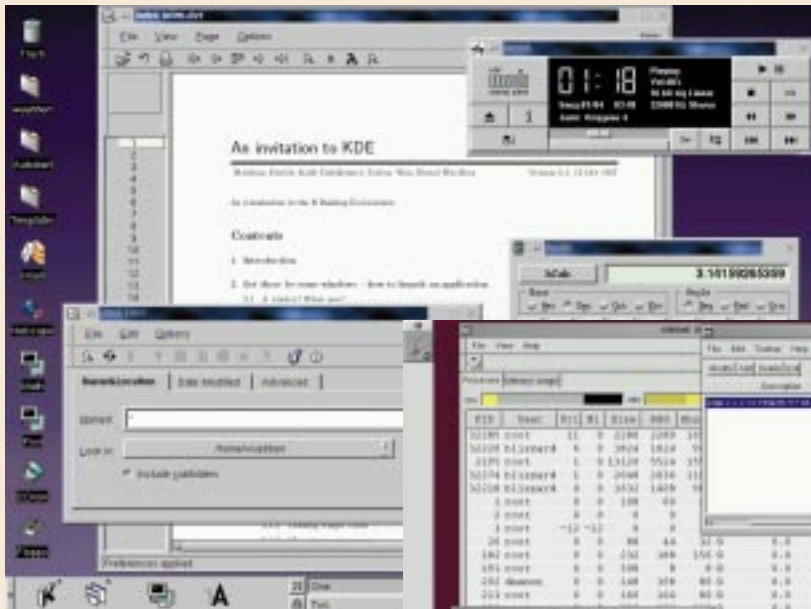
◀ I GET A LOT OF MAIL ASKING ABOUT THE TWO MAIN CONTENDERS FOR THE LINUX DESKTOP STAKES, KDE AND GNOME. LUCKILY, YOU DON'T NEED TO DELVE INTO THE DEEP POLITICS INVOLVED TO REAP THE BENEFITS. JUST DOWNLOAD THEM. THIS IS WHAT KDE LOOKS LIKE...

▶ ...AND HERE'S GNOME. I'VE BORROWED BOTH SHOTS FROM THEIR RESPECTIVE WEB PAGES AT WWW.KDE.ORG AND WWW.GNOME.ORG. I'M NOT ACTUALLY RUNNING THEM ON MY OWN SYSTEM HERE BECAUSE, LIKE LINUS TORSVALD, I STILL PREFER UNFUSSY, TRIED-AND-TESTED, GOOD 'OLE FVWM

virtually locked up my machine and found several under /etc/cron.daily. The culprit seemed to be /etc/cron.daily/ updatedb.cron, which is a script that triggers the updatedb utility. This runs around all the files on your system, collecting information for the global file database used by locate.

My main problem, however, was that at 16Mb my swap file was too small. I have fixed that now, but the other thing I want to do is to modify that updatedb.cron script to check on available memory and, if it's low, delay running updatedb. I think I know how I am going to do this (*hint: /proc/meminfo is an ASCI file that keeps track of available memory*) but you may have some better ideas about it. So, I am going to leave this

as "an exercise for the reader" and I will publish the best solution sent to me.

■ **Just lately**, the trickle of email complaining that I spend too much time writing about Linux in this column has

> *I have to acknowledge that Linux is the fastest-evolving and most widely ported version of Unix there is*

tailed off. This may be because Linux seems to be hitting critical mass and everybody is now interested in it in one way or another. When a once obscure "hackers' operating system" finds itself

being profiled in *The Economist*, you know things are getting serious. Just to recap — this is not "The Linux Column". The focus here is Unix. But I have to acknowledge that Linux is the fastest-evolving, most easily accessible and most widely ported version of Unix there is. I know people like to describe Linux as a "Microsoft killer", but personally, I am not interested in killing anybody or anything. Linux is promulgating the Unix way of life, and as I have said before in this column, one of the most important things about Linux is that when you are using it and learning about it, you are, in addition, using and learning about Unix.

MINT CONDITION

☛ **Here's a welcome reminder** that the Unix philosophy extends far beyond any particular implementation.

"I've been reading your column for a couple of years now, and I suspect there are many 'lurkers' who read it but have not yet got around to installing Linux. I thought it might be useful for your readers if I were to point out that Unix-style operating systems run on more than just PC clones and dedicated workstations. I daresay that a number of readers have old Atari STs and Commodore Amigas sitting in cupboards. If not, they can be picked up cheaply these days. Several of these will run Linux 68k (or a similar variant of NetBSD) and might be a good way to dip a toe into the water.

"My own Atari system runs neither Linux nor NetBSD. Instead it runs MiNT, an acronym that originally stood for 'MiNT is Not TOS' (where TOS is the unfortunately-named OS of the Atari) but which had the 'Not' changed to 'Now' when Atari licensed it as the core of its multitasking OS (MultiTOS!).

"The point is that MiNT will run on even the lowliest ST, and basically adds a pre-emptive multitasking OS based on BSD Unix. Consequently, a number of command-line utilities have been ported, including internet stuff and the like. There's even a version of X for it, although it's more of a curiosity than anything practical.

"As an introduction to Unix, MiNT is cheap and relatively straightforward. You can also use the GUI built in to the ST to run a 'normal' Atari program at the same time, or add a multitasking GUI to run several of them . For any real Atari fans, there is also an Atari emulator for X (called STonX) which emulates well enough to run MiNT, if you really want to get silly.

"Anyway, although this seems to have now turned into a shameless plug for all things Atari, I really wanted to point out that there are cheap alternatives for people who want to give Unix a try, but don't want to chance 'messing up' their main machine."

Mark Crutch
xav@compsoc.man.ac.uk

Thanks for that, Mark. Readers can follow up on this by visiting Mark's web site at www.compsoc.man.ac.uk/~xav. *I seem to remember somebody producing a Unix port for Sir Clive Sinclair's QL (which we regarded as a terribly cheap machine at £600 in the mid-eighties) and before that the Dragon 64 had an alternative Unix-like*

The point is that MiNT will run on even the lowliest ST

operating system called OS/9. Next time I see a pile of Ataris at a car boot sale, I'll view them with more respect.

☛ **A suggestion** with a tinge of criticism comes from Martijn Herber, who is kind enough to call me "a lone voice in the deafening

(and dulling) roar of Wintel rhetoric, and much appreciated!". He's objecting to the space I gave, back in the July column, to Owen Kelly cpx4@hotmail.com. Owen's problem was a common one. Coming from the world of DOS and Windows, he was baffled about how to find his way around Unix. What, he wanted to know, were the equivalents of elementary

Coming from DOS and Windows, he was baffled about Unix

commands like DIR and DEL in UnixSpeak? I'm only too sympathetic to Owen's plight because it doesn't seem so long ago that I was scratching around looking for a path through the long grass. But Martijn thinks this column has better things to do than spoon-feed neophytes.

"But really, should this person not have taken the effort to read some of the very most basic docs? This kind of stuff is just something you will find in any of the online manuals," writes Martijn. A piece of online documentation that helped him get started is the DOS/Win-to-Linux-HOWTO by Guido Gonzato, from www.caldera.com/LDP/HOWTO/DOS-Win-to-Linux-HOWTO.html, among other places. He also recommends "the excellent Linux Installation and Getting Started Guide, by Matt Welsh". Like the HOWTOs, this online book is part of the Linux Documentation Project (LDP), also accessible from the Caldera site. Martijn is concerned that by spending too much time dealing with

beginners' issues, this column may be missing the point. He argues that we're being too defensive — trying to prove that "you can do it with Unix, too," rather than focusing on the unique features of the operating system and its own way of doing things. "How about some columns devoted to advanced technologies?" he asks, "stuff the rest of the industry can't do (or at least not for the price of a couple of CD's)? And how about a look at some of the 'principles' behind Unix? Actually, this is what drew me away from Microsoft: ideas like 'small is beautiful', 'everybody has a right to see the source code and compile it', 'make one program do one job real well', that prevail in the Unix world."

Martijn Herber,
fam.herber@wxs.nl

We have at least touched on most of these things over the course of the past five years. If you're new to the column you might want to start by checking out http://cesdis.gsfc.nasa.gov/beowulf/ *or the Jazznet site at* http://math.nist.gov/jazznet *for an insight into how Linux is powering farms of standard hardware to create cheap supercomputers. The question of Unix principles is harder to deal with. I hope it's a thread that runs through everything I write here; for an excellent and thorough discussion, let me once more recommend Mike Gancarz' "The Unix Philosophy", by Digital Press.*

PCW CONTACTS

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Hard times

It's cheap, and it should be easy to get more mileage from your hard-disk space. But beware of some common problems, says Terence Green.

Now that gigabytes-worth of hard-disk storage costs pennies, many people are discovering problems when they try to install Warp 4 and Warp 3 which shipped before disk sizes began to escalate. There are some common problems. For instance, adding a new drive and discovering that Warp doesn't like it, or adding a new ATAPI (IDE) CD-ROM drive, or attempting to install Warp 3 or Warp 4 onto a new, large drive [Fig 1].

Reader Colin George discovered the problem when he bought a new Quantum 6.4Gb drive for his PC, which dual-boots Windows 95 and Warp 3. Having formatted and partitioned the new drive under Windows 95, he discovered when booting into Warp that OS/2 FDISK reported that the partition data "may be corrupt". This is expected behaviour. Since Warp 3 pre-dates Windows 95, it has no way of understanding what Windows 95 does to

...the OS/2 FDISK reported that the partition data 'may be corrupt'

the FAT data in the drive partition tables in order to enable long filenames. The answer is to obtain and install the latest version of **IDEDASD.EXE** from IBM's Device Driver Repository at ftp://service. boulder.ibm.com/ps/products/os2/ os2ddpak/idedasd.exe. This contains updated device drives for EIDE drivers and IDE CD-ROM drives. Note that this update specifically addresses drives which attach to EIDE interfaces — it is not required for SCSI hard drives or devices. IDEDASD.EXE is only a small file (about 130Kb) but I've placed a copy of it anyway on our cover-mounted CD.

This version (which I downloaded in early August) supports hard disks up to and over 8Gb in size. Place it in a temporary directory and execute it to extract the files, then read the README.TXT file for instructions. You will need to install the files in IDEDASD.EXE if you plan to add a new multi-gigabyte hard drive — or a removable drive such as a CD-ROM or Zip drive — to the EIDE interface in your PC. You also require the files if you are planning to install Warp 3 or Warp 4 onto a new system which contains any of the aforementioned drives. Finally, this version of IDEDASD.EXE also updates some glitches in the files of the same name which were included in the Fix Paks on July's *PCW* cover disc, so you should install it if you applied either Fix Pak #35 for Warp 3 or Fix Pak #6 for Warp 4.

The readme.txt file in IDEDASD.EXE explains the various procedures in detail, but readers may still find the odd glitch preventing them from accessing their new large hard disks. If, having installed the files correctly, you still have a problem accessing your new drive, you may have a motherboard that does not fully support BusMaster DMA. Since the new device drivers set

busmastering on by default, try disabling it by editing the following line in CONFIG.SYS;

```
basedev=ibm1s506.add /a:0
  /!BM
```

The "a" refers to the IDE channel number beginning with 0 (zero) for the primary channel. You can type HELP IBM1S506.ADD at an OS/2 command prompt to display the full set of help information for this device driver.

■ **A fair number of readers** say they would like to run dual Windows 95 or

Windows 98 and Warp systems. The best way to do this is to use IBM Boot

Manager to switch between them at boot time. You need a partitioned hard disk with one partition for Boot Manager and another partition for Warp, in addition to the primary C: partition in which Windows 95/98 usually resides.

If the drive only has a single partition, setting it up to install Warp as well will entail deleting the Windows partition in order to create multiple partitions. You can do this manually by backing up all your data, deleting all partitions and re-partitioning. Or you can use PartitionMagic from PowerQuest [Fig 2] to do it on the fly. You should still back up all vital data, but at least you can prepare the drive from a graphical console without requiring a master's degree in PC drive partitioning.

Unless you are a drive partitioning expert, I recommend PartitionMagic because it will also help you to bypass the FAT32 problem. Warp cannot see partitions formatted with the FAT32 file system which was introduced with Windows 95 OSR2 and carried into Windows 98. In order to install Warp on a PC, it must have at least one partition formatted for FAT16. You don't have to keep the partition formatted FAT16, but Warp Installation won't work if it can't find either a virgin, unpartitioned, first physical drive or a FAT16 partition on that drive.

■ **Good news arrived** in August when the first beta of Netscape Communicator

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ASSIGNING DRIVE LETTERS

Reader Esmond **Poynton**, having moved from Warp 3 to Windows 95 and now wishing to reinstate Warp, would like to partition: a 4.3Gb drive with Windows 98 on C:, a Zip drive as D:, a CD-ROM on E:, and Warp on F:.
Clearly, he wants the drive letters to remain the same in both systems, but Warp will not allow drive letters to be assigned to removable drives ahead of fixed drives. So, in practice, the drive letters will be assigned as follows:
☛ **C:** Windows 98 (fixed drive)

☛ **D:** Warp (fixed drive)
☛ **E:** ZIP drive
☛ **F:** CD-ROM drive
This holds true with a FAT-formatted Warp partition but if you select HPFS for Warp, Windows 98 will not see the Warp partition and the ZIP drive will become D: when booted into Windows 98, while the CD-ROM will become E:.
The solution is to assign the required drive letters to the ZIP and CD-ROM drives in Windows 98. This can be done from Windows 98/Control Panel/System/ Device Manager by highlighting the drive,

clicking on Properties and assigning the same letter to the drive as it has when booted into Warp.
It is also necessary to install Fix Pack #35 (or later) for Warp 3. FP35 adds the full support for removable drives which enables Warp to automatically assign drive letters to the ZIP drive. The same holds true for Fix Pak #6 and Warp 4. Both Fix Pak #35 and Fix Pak #6 can be found on *PCW*'s July 1998 cover-mounted CD-ROM.
See page 10 of this issue for information on how to obtain back issues.

4.04 for OS/2 shipped [Fig 3]. I've had a chance to play with it and it looks pretty good. There's another round of beta testing to come which may not be out by the time you read this; but if not, it won't be long. It's modelled on the same code as the Windows-based Communicator

versions and has pretty much the same look-and-feel to it. You won't find the Netscape Communicator beta on our cover-mounted CD-ROM, as I've decided against including beta software for two reasons. First, given the long editorial lead times for this column, we could find ourselves publishing beta software around the time the shipping product appeared. And second, I have received only one reply in favour of providing betas on the *PCW* cover disc — so, sorry, Phil Harrison, but you've been outvoted.

Phil also suggested keeping major downloads, such as Fix Paks, on cover-mounted CD-ROMs for as long as they are current. This is a fine idea, but unfortunately the pressure for space on the *PCW* CD-ROM makes this impossible. You will just have to buy the magazine every month or, better still, subscribe [see p10].

◀ **FIG 3** **NETSCAPE COMMUNICATOR 4.04 FOR OS/2 WARP WENT INTO THE FIRST BETA ROUND ABOUT THE BEGINNING OF AUGUST**

PCW CONTACTS

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Mind your language

Avoid that US English proofing in Windows, as Tim Nott presents a way to change languages from the system tray. And, good news for victims of WordPro 97 dictionary syndrome.

In September's column, we finally (or so I had thought) laid to rest the mystery of why Word insisted on defaulting to US English as the proofing language. It was, it turned out, all related to the Windows keyboard settings. The positive side of this is that you can use the multilingual support of Windows 95 or 98 to change languages from the System Tray — that bit of the Task Bar where the clock lives. Several readers have asked how you enable this, and Matthew Trump, of the British Council in Slovenia, provided the final, missing piece of the puzzle:

Go to Windows Control Panel, Keyboard, and select the Languages tab.
Click the Add button and select the additional (or default) language you want to use for proofing.
Highlight this, and then click the Properties button.
You will then (as I missed, but Matthew didn't) get the opportunity to choose the keyboard layout independently.

If you are using multi-lingual proofing, then having enabled the Taskbar icon (or keyboard shortcuts) you will be able, for instance, to click on this, switch, say to French proofing, without having to use the AZERTY layout, exactly the same (though much quicker) than using Word's Tools, Language, Set Language. Even if you are using just one language but, like Bob Monroe, want to proof in British while using a US keyboard layout, you can do this by altering the properties of the default language (British) to use the US keyboard layout.

WordPro woes

At last, some good news for victims of the user-dictionary-goes-read-only syndrome in WordPro 97. John Birtwistle brought to my notice a document on the Lotus Web site www.lotus.com which acknowledges the problem. A search for the document 147344.txt reveals that: "While using Spell Check (File, Check Spelling) the system crashes. The system is then brought up and the spell check is resumed. Attempting to add a word to the user dictionary results in the following error message: 'Cannot modify user dictionary because it is in use by another program'." It doesn't actually address the problem of why the system crashes, but does tell us of a fix which, as we had surmised, is to remove the read-only attribute from the user dictionary file: typically C:\Lotus \Compnent\Spell\LTSUSER1.UDC.
There is better news, though. First, as John points out, this has been fixed in subsequent releases: his version N97.807.0 doesn't exhibit the problem. Second, as William Sutherland informs us, there is a repair patch for existing victims at www2.support.lotus.com/ftp/ pub/desk /Drivers/win95.
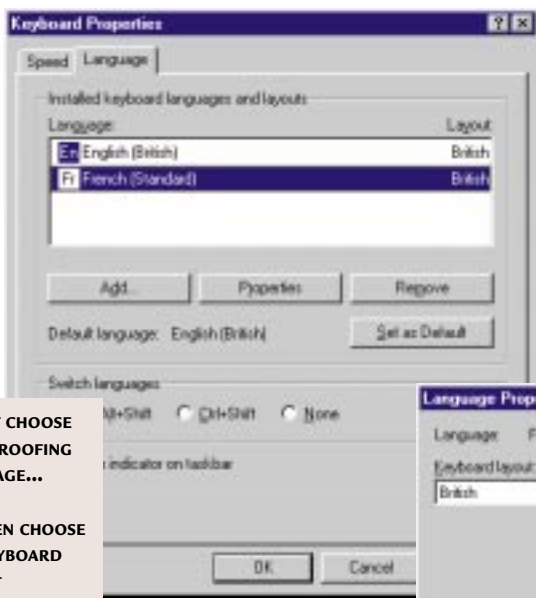
▶**FIRST CHOOSE YOUR PROOFING LANGUAGE…**

▶**…THEN CHOOSE THE KEYBOARD LAYOUT**

QUICK TIPS

☞ **If you're sending** WP documents as email attachments, stick to using the Windows TrueType core fonts (i.e. Arial, Courier New and Times New Roman in Windows 95) unless you are sure the recipient has any other fonts you may be using. Otherwise the missing fonts will be substituted (often by monospaced Courier) on the recipient's machine, which will almost certainly mess up the formatting, particularly if you are using tables or columns.

☞ **I mentioned** (July issue) the annoyance of having Word auto-complete dates and that turning off "Show AutoComplete Tip…" gets rid of this. Gary Porter, who "finds AutoCorrect annoying and useful in about equal quantities", has an alternative method "…when the yellow suggestion box pops up, hit Esc to continue as normal."

☞ **If it's important** that they see other fonts you may want to use, then it can be possible to embed the extra fonts in the document. There's an option in Word's Tools, Options, Save. However, there are three snags. First, not all fonts support this feature; it's at the manufacturer's discretion. Second, it will add substantially to the file size. And third, it may limit the recipient's ability to edit the document.

Questions
& answers

Q Two problems. My phone number has the number 50 twice in succession: is there any way to add this to any dictionary to stop the Word spell-checker making a halt? Similarly, when I write the Australian states (e.g. N.S.W.) the same thing happens: the spell-checker stops without the possibility to hit the add button.

Bob Reksten, Monaco

a *I can't think why it won't let you add N.S.W. Perhaps the user dictionary has caught the WordPro bug (see* **WordPro woes,** *left)? With regard to the number problem, this is because your phone number is formatted the French way, with spaces between each pair of numbers, and you can't add "50 50" as a word.*
There is a solution to both problems, however. Go to Tools, Options, Spelling and Grammar, then tick the two boxes entitled "Ignore words in UPPERCASE" and "Ignore words with numbers".

Q Whenever I cut text and paste it into Word from, say, a web browser it is often full of return characters which I don't want. I can't find an easy way of getting rid of them.

Nick Bowen

a *Nor, it seems, can Word's Autoformat. The simplest thing is to record a macro. Usually, such texts will contain a return at the end of each line, which you don't want, and two returns at the end of each paragraph. You will usually want to keep the paragraphs, so turn on the macro recorder and do a*

search for ^p^p, (^p stands for the return symbol in Search), replacing it with @#~@, or any other symbol combination strange enough not to appear naturally in the text. Hit the Replace All button. Repeat the process to replace all single occurrences of ^p with either a space (if there are no spaces at the ends of a line) or nothing if there are spaces before each return. (Hint – turning on All Formatting Marks from Tools, Options, View helps establish this.) Finally, repeat to substitute single paragraph marks (^p) for the dummy @#~@ symbols.

Q Using Word 97, I was making a short list of quotations when I gained a line across the page which was very difficult to get rid of. I couldn't find anything in Help and it wouldn't delete. Eventually I chased it away by re-copying all the text to a blank sheet as unformatted text. I suspect that I may have caused the appearance of this line by putting about a dozen hyphens between each quotation. How can I avoid this happening?

Michael Burch, Oman

a *Yes, as you suspected, it's those hyphens. Word is very cleverly assuming you want these (and various*

other repetitive patterns) converted into top paragraph borders. To turn this cleverness off, go to Tools, AutoCorrect, AutoFormat As You Type, then untick Borders in the top section.

Q The feature I miss most from Ami Pro, now that I use Word, is the ability to format text with a line above it, extending the width of the text rather than the paragraph. I've tried selecting the text and using both the drop-down border button and Format, Borders and Shading in a variety of combinations. In all cases, what I end up with is either no line at all, a box around the text, or a line above the paragraph, extending to the margin width.

Mike Schorah

a *As you've discovered, attempting to do this with borders is an excellent way to drive oneself barking mad. If you just want to do this to a heading, then one way is*
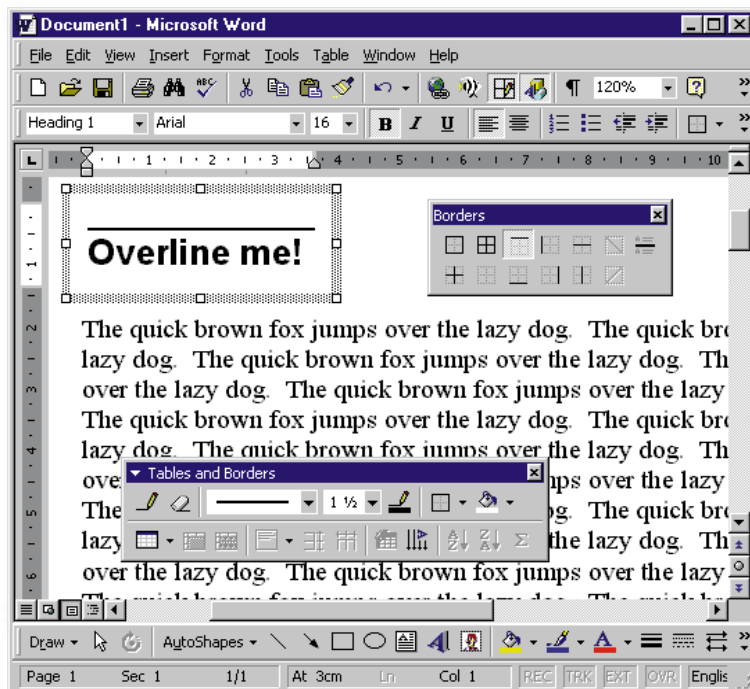
▲ **IT CAN BE DONE – USING A TEXT BOX TO CREATE A TOP-ONLY BORDER**

to create a single-cell table. You'll find you can then format each cell border separately. This will also work with text boxes. You need to format the text box itself to have a "No Line" outline colour, then use the border tools to create a top-only border inside the text box. Alternatively, if you want to do this in the middle of a paragraph, say, you can use the drawing tools, but as it's something of a fiddle to get the line to stay in the correct position, it's advisable to do all your other editing first.
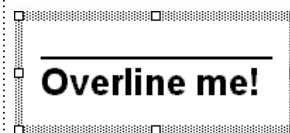
PCW CONTACTS

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Taking the hint

Don't lose your cool when you're up against it in Excel. Stephen Wells presents some sharp tips to help you work with spreadsheets faster.

▶ **VIA EXCEL HELP, YOU CAN GO TO THE EXCEL WEB SITE FOR THE LATEST DEMOS AND DOWNLOADS OF PATCHES AND TEMPLATES**

This month I have looked at a range of the most effective ways to use spreadsheets without losing your mind. Here are some of the best Excel hints and tips around.

☞ **The difference between** the FIND and SEARCH functions:
You can use either to find one string of text within another, but FIND is case-sensitive (it knows the difference between capitals and lower case) and SEARCH allows wildcard characters (? and *).

☞ **How to enter,** say, a nine-digit part number as 012345678 and have it display as 0 123 45 678:
Create a custom format for the column using 0 0## ## ###.
The first zeros let you start with zeros if required. This format is a number, not text, and in other cells you can add and subtract from your entries.

☞ **How to save** a workbook to the Desktop:
Choose File, Save.
Excel, by default, saves files in the My Documents folder. In the Save In list box, click the Up One Level button three times. Now the Desktop folder name displays and you can save your file.

☞ **You can display** a date as 5/7/98 rather than 05/07/98:
This is one of the standard offered Date formats but not Excel's default version. Right-click and choose Format Cells, Date and then pick the right type.

☞ **How to get** a record of the files initially installed by Office 97:
In the directory C:\Program files\Microsoft Office\Office\Setup look for the file ACME.LST. You can open it with WordPad.

☞ **You can display** two Excel worksheets at once:
Choose Window, New Window, then Window, Arrange.
Choose among the arrangement options, then OK.
Select from the tabs at the foot of one Window to pick the second sheet to display.
To show more tabs, hold the mouse button and slide the vertical line to the right of the visible tabs.

☞ **Reverse the order** of two displayed worksheets:
When one is active, right-click on the Title Bar of the inactive sheet and choose Arrange, OK.

☞ **To jump from** one Window to another:
Press Ctrl+F6.

☞ **The fastest way** to insert a block of cells:
Select the range where you want the new block inserted. Hold down the Shift key, then drag the fill handle at the lower right of the range.

☞ **The fastest way** to copy a range of cells to several worksheets:
Hold down the Ctrl key and click the tabs of the sheets to which you wish to copy the range. Select the range. Then choose Edit, Fill, Across Worksheets, All.

☞ **And the fastest** way to total a range of figures:
Click the cell where you want the total then double-click the AutoSum tool. This bypasses the step where Excel normally outlines the cells to be totalled.

LANGUAGE BARRIER

In the May '98 column, reader Steve Lyons had a problem with Excel 5.0: he works in England for a company which also has offices in Switzerland, and was experiencing problems opening some spreadsheets from the Swiss branch.

William Crichton, at Kodak, throws some more light on the matter: "With reference to your article in the May issue, I have experienced this language problem — exchanging Excel files between offices — because I deal with other European countries. The simple fact is that all the other language versions of Excel include the English DLLs, and so on, but the English version *only* has the English ones.

"This means that if the macros are written in an English version, all other European versions can run them but not vice-versa. Therefore, international companies should standardise on the English version."

Questions
& *answers*

Q You have previously described using the SUBTOTAL function for Excel, Lotus and Quattro Pro. But is it possible to use a variable number of rows in the SUM or SUBTOTAL functions? This might be used where columns of data are slowly increased in length as new entries are added. In Excel, the SUM function might read =SUM(A1:A10) after one iteration, but will then need to read =SUM(A1:A11) after the next. Can I vary the length of the SUM command?

JEFF DUNN

a *The traditional way around this is to select your current range plus another row at the bottom (blank) and give it a Name. Then write your SUM function using the Name.*

Q I have one machine running Windows 3.11/Excel 5 and another running Windows 95 and Excel 7. After loading some spreadsheets in v7 and then back into v5, I get the error message "File format no longer supported". It only seems to happen for files containing macros, and I get the same error message when I try to record any new macro in v5. Re-installing Excel 5 doesn't help. It's rendered v5 useless and is driving me mad.

JIM POLMEAR

a *You can save an Excel 97 file in the dual format: "MS Excel 97 & 5.0/95 workbook", or "Excel 5/95 workbook", or "Excel 4", but there is no option to save in Excel 5 for Windows 3.11. You should probably*

save it in Excel 4, then open that file in Excel 5 (although I don't have Windows 3.11 around to try it for you). As for macros, it is two different systems. VBA has changed too much between versions for backwards compatibility. And lot of people, I have realised, suffer these same problems when they have an up-to-date platform at home, when their office, because of potential multiple-unit hardware costs, lags behind.

Q Owing to changes in my business, I have re-read your *Financial Analysis* series of articles. Did the templates, especially for the service company, ever get onto a *PCW* cover CD?

PETER HARRIES

a *This series appeared in PCW from the September '94 to January '96 issues. The templates were repeated on the cover-mounted CD-ROM on our May '97 issue (see p10 for how to obtain back issues).*

Q In Excel 97, is it possible to change the format of a cell within a formula? I have a column of dates and a lookup table of payment dates. If the date in the cell matches a date in the lookup table, I want to be able to format the text in red. I'm sure you used to be able to do this in SuperCalc.

Also, I picked up a nice little World Cup spreadsheet the other day, and in the background there was a wallpaper effect with France 98 on it. I can't figure out how this is done. It doesn't appear to be in the cell formatting. Do you have any ideas about this?

ANDY BETES
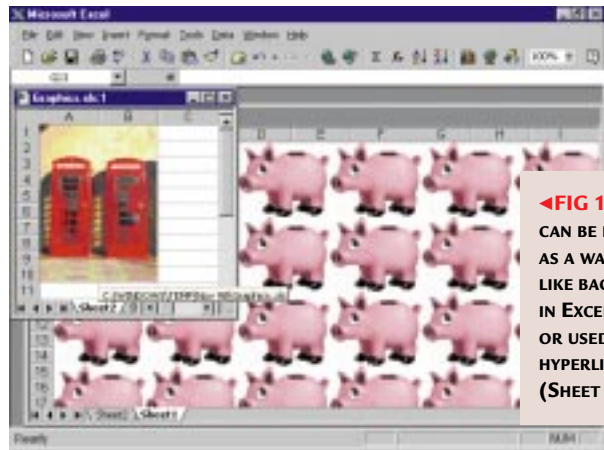
a *To format text red under certain conditions, choose Format, Conditional formatting. And also read "Apply conditional formats to cells" in the Help file. To add a background graphic, choose Format, Sheet, Background and select a graphic like the pigs in Fig 1 from, say, the Office CD-ROM. If you want one large scene, not repeated on the page, resize the graphic before you import it or pick a large graphic (Fig 2). To use a graphic as a hyperlink — meaning, you can click on it to go somewhere else — choose Insert, Picture, ClipArt, like the phone boxes in Fig 1. Resize with the corner handles, then press Ctrl+K and assign the hyperlink.*

Q Is it possible in either Excel 95 or Excel 97 to put a line feed within a cell so that a long sentence wraps around onto a new line but within the same cell, like word wrap?

ANDREW JOHNSON

a *To display multiple lines of text within a cell, first select the cells you want to format. Then, in the Format menu, click Cells and then click the Alignment tab. Under Text control, select the Wrap text check box.*

To start a new line of text at a specific point, you just click in the formula bar — or cell, if you are editing in the cell — where you want to break the line, and then press ALT+ENTER.
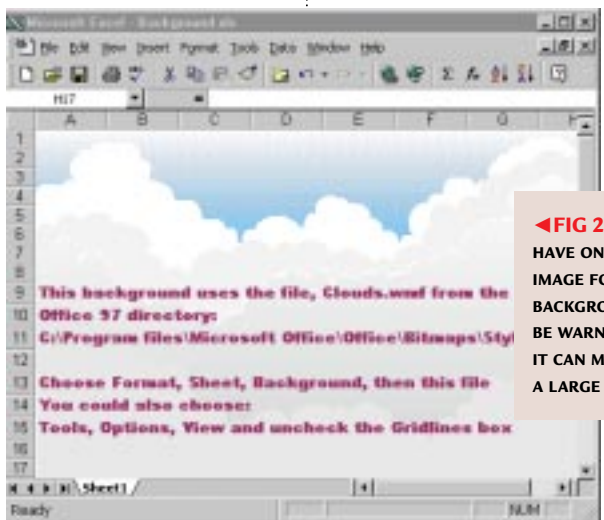
Road to recovery

Damaged database? Lost information? Mark Whitehorn forms a one-man anti-corruption squad to root out repair options and ways to recover lost information.

In my experience, well written, single-user Access databases are very reliable, and corrupt databases are rare. Corruption becomes more common — but still very infrequent — when multiple users access the same database file. Of course, it is perfectly possible to write an Access application so badly that it actively mangles the database. But, presumably, since we are all too smart to actually ever do that, it is never a problem in real life. Well, not entirely. On rare occasions Access databases do become corrupt and I've received several letters asking about ways to recover information from such databases.

Single file

An Access database stores everything in a single .MBD file — that's tables, data, queries, forms, reports, code, macros... the lot. The internal structure of this file is horribly complex and although the specifications may have been published, they are certainly not well understood. To add to the complexity, the structure changes with every upgrade (BTW — the most recent version, Office 2000, for the first time in history can actually write files in the previous version). It is fairly common, however, particularly with multi-user databases, to store the data in one .MDB file and store the rest in another. I recommend this strategy, but for the purposes of this article I shall presume a single .MDB file: in practical terms there's little difference between dealing with either arrangement. Damage to a database can affect either the data or the components that comprise the database structure, or both. Occasi onally, comp onents can become broken in relatively subtle ways.

One I experienced recently was a form that appeared perfectly normal when it was used to look at data, but whenever it was used to print records, it printed those requested and then continued to print an apparently infinite set of blank pages. I let it run for a while to see where it would stop, but my nerve finally ran out and I killed the print job at 7,000-plus pages. Before Greenpeace put me on a hit list, these were virtual pages in the print queue. It goes without saying that you will be making regular backups to disk or tape, of any and all MDB files that you use. But think about saving the old backups (essentially making them incremental) using a simple naming scheme like 10DEC1998.MDB. This will provide a series of snapshots of the database at particular points in time. So, imagine that you have a database

I let it run for a while, but my nerve finally ran out and I killed the print job at 7000-plus pages

which opens and all of the components work, except one, say a form that has gone rogue. What can you do?

☞ **Immediately** make two or three copies of the damaged database and work on one of these. That way, things won't get any worse. If the form is simple, just delete it and recreate it.

☞ **But what if** the form is complex and would be time-consuming to rebuild? Try running Repair Database from the Tools, Database Utilities menu and see if that helps [Fig 1]. The repair utility will tell you if it can't fix a problem, but blithely reports that it has successfully repaired the database [Fig 2] regardless of whether it found anything to repair or not!

☞ **What if** that didn't work? Assuming that you have incremental backups, work your way back through the files until you reach a working version. There's no absolute path to follow now, but working logically and methodically you can swap-in the working component
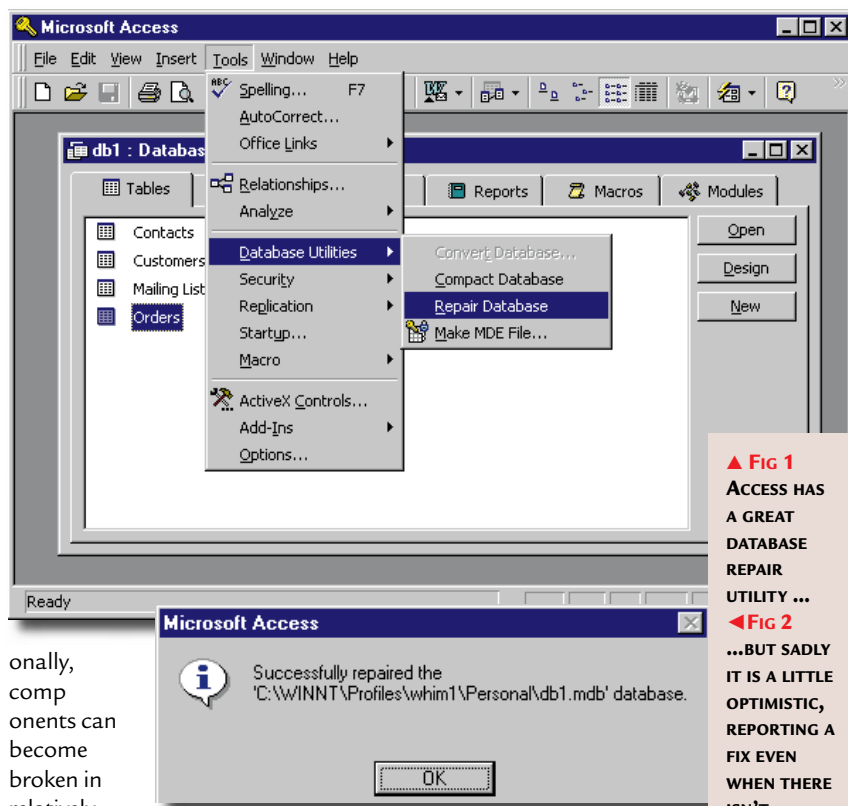
▲ FIG 1
ACCESS HAS A GREAT DATABASE REPAIR UTILITY ...
◀FIG 2
...BUT SADLY IT IS A LITTLE OPTIMISTIC, REPORTING A FIX EVEN WHEN THERE ISN'T ANYTHING WRONG. THIS MEANS YOU CAN'T TELL WHETHER IT HAS FOUND A PROBLEM, LET ALONE FIXED IT

from this .MBD file to replace the rogue one. Incidentally, queries are among the easiest to swap as you can open one in design mode, go to the SQL code and cut and paste that. Since this is pure text, it usually transfers well. As another aside, before anyone tells me that you can't

Most of this comes down to using common sense and trying not to panic

open two .MDB files at once in Access — I know. This makes cutting and pasting between .MDBs a pain. However, there is nothing to stop you running two instances of Access on the same machine and flitting between them with Alt-Tab.

☞ **Think about** what is vital in the .MDB file. This is usually the data, so try exporting it as text files. That is relatively straightforward, and if it can be achieved, you can relax a bit. Then create a new .MDB file and try to import the tables into that from the damaged .MDB file. If you can do that, then you have rescued not only the data but also the data types etc.

☞ **Next, start moving** components, one at a time, from the damaged to the new .MDB. Clearly it makes sense to try to identify the damaged component(s) and move everything but these. It also makes sense to check that everything is working at each stage of the replacement to ensure you haven't reproduced the problem. If the database has hundreds of forms, reports and so on, copy them in batches and continue to test to see if you've brought in a duff component.

Don't panic!

To sum up, most of this recovery process comes down to using common sense and trying not to panic — and keep taking the incremental backups.

PCW CONTACTS

Mark Whitehorn *welcomes readers' suggestions and feedback for the Databases column. He can be contacted via the PCW editorial office (address, p10) or email* database@pcw.co.uk

THE CRAFTY COMBO BOX
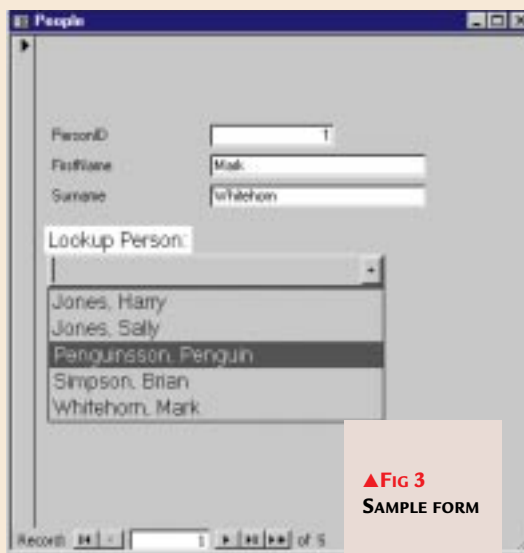
▲**Fig 3**
SAMPLE FORM

The following combo-box tip comes from Chris Veness chrisv@movable-type.co.uk.

"The standard 'navigation buttons' normally displayed at the bottom of forms generally correspond to working through an unsorted list one by one. I often find a better way of allowing users to find records is the combo box.

Take a form showing information about people and assume the form is based on a table which includes fields for PersonID, FirstName and Surname. What I generally do is create an outsize combo box named something like LookupPerson (I also make it the same colour as the form, and raised, so that its appearance distinguishes it from fields used for entering information). The Control Source is left blank so that it is 'unbound' and the Row Source is set to something like

```
SELECT PersonID, Surname & ", " & FirstName AS Name
  FROM Person
  ORDER BY Surname & ", " & FirstName;
```

"The Column Count should be 2, the Bound Column 1, and Column Widths set to 0cm to hide the first column (the width of the second column doesn't need to be specified). It's best to set Limit To List to Yes and AutoExpand to Yes, and probably to leave the List Width at Auto. This creates a pick list that will show all the people in the database, in alphabetical order.

"Now we have to make it look up the details for the person selected from the list. This is done by associating an event procedure with the After Update event of the combo box. This will be along the lines of:

```
  Private Sub LookupPerson_AfterUpdate()
  Me.RecordsetClone.FindFirst"PersonID = " &
Me!LookupPerson
 Me.Bookmark = Me.RecordsetClone.Bookmark
  End Sub
```

"FindFirst won't operate directly on a form, so we have to use the RecordsetClone property of the form. Doing a FindFirst on the RecordsetClone won't affect the form until we synchronise it by setting the form's bookmark to the RecordsetClone's bookmark. Not only is this pick list easier to use, the auto fill means that the user can type the first few letters of the name and the pick list will automatically move to the matching entry."

Nice one, Chris! I have built a sample form [Fig 3] based on Chris's idea and it's on our cover-mounted PCW CD-ROM this month. Admittedly, I know it is in Access 97, not 2.0, but unfortunately the portable on which I am writing this doesn't have Access 2.0. However, all I did was follow Chris's instructions, so Access 2.0 users should be able to whip up the same sort of thing in about five minutes. Bear in mind that while this combo box works beautifully for small sets of records, it will get slower as record numbers increase.

Making the connection

Roger Gann gets to grips with the profusion of SCSI connectors: tackling the installation of Ultra 2 SCSI, and a fine example of how hardware profiles can be an invaluable diagnostic tool.

As promised last month, I'll round up my musings on SCSI with some leftovers and titbits. As you will have seen from the screenshot in last month's column, there are as many different types of SCSI connectors as there are standards — too many, in fact. Some of them were defined with SCSI-1 and are now obsolete, like the DB-50 connector, even though you still find it on current Apple Macs, Zip drives and the like. The most common ones today are the 50-pin Centronics-type SCSI-1 connector, the 50-pin High Density SCSI-2 connector and the 68-pin Ultra SCSI version. Most new host adapters and external devices use the SCSI-2 HD.

This profusion of sockets is very bad news indeed, particularly for the pocket. I have SCSI devices with all four types of connector on them, and in order to guarantee that I can connect to them, I have to have cables to suit the various permutations. At about £30 a pop for a SCSI cable, I reckon I must have £300-worth of wire lying around my office. Cable lengths were defined up to 6m maximum in SCSI-1 and SCSI-2, for a single-ended SCSI bus and up to 5Mb/sec data rate. Keep this in mind, if you use long cables, and include the internal device cables in your cable-length calculations. With Fast SCSI-2, as the data rate doubled to 10Mb/sec, so the maximum cable length was halved to 3m. SCSI-2 allows up to a 10cm cable "stub" length from the device to the main bus cable. Sometimes this length is exceeded, causing higher capacitive loading.

These limitations can be overcome with a different kind of host adapter, one that supports "differential" SCSI. A differential SCSI bus can use the full cable length up to 25m (approx. 82 feet) and keep the maximum data rate of 10MHz. This is especially important with external devices, as most external single-
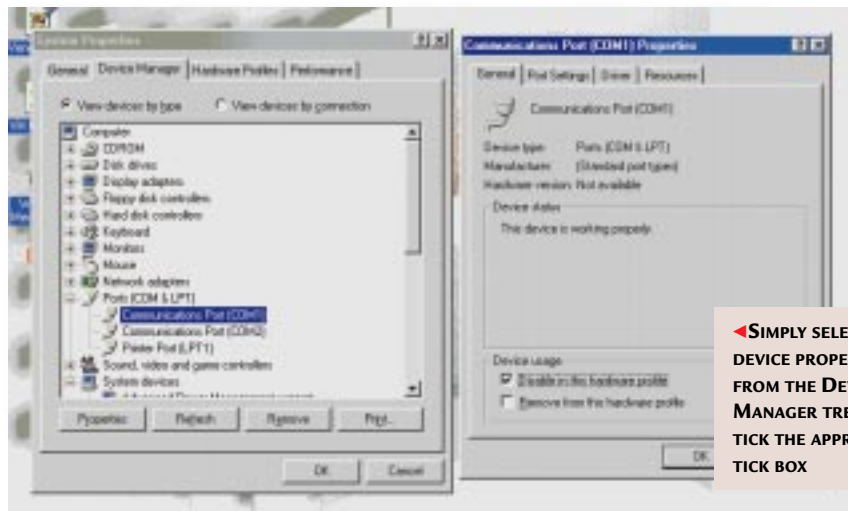
◄ **Simply select the device properties from the Device Manager tree and tick the appropriate tick box**

ended cables can't cope with 10MHz. But you can't mix and match differential and ordinary SCSI devices on older host adapters. There is a compromise of sorts, and this technology is now a part of the Ultra 2 SCSI standard.

COM and get it

And now some light relief. A columnist on this magazine phoned me the other day with a COM port problem. He'd upgraded his old Gateway P166 to Windows 98, and in doing so, his modem, which normally sat on COM1, had ceased to work. As soon as the PC booted, the TR (Terminal Ready) LED on the modem came on and stayed on. And if he tried to access the modem

I reckon I must easily have £300-worth of wire lying around my office

from DUN or HyperTerminal or even via modem diagnostics, up would pop an "Open COM port" error message. He'd tried everything to get to the bottom of it — Safe Mode, the new System Configurator tool, Dr Watson — you name it, he'd tried it; but everything failed. He'd looked at what was running in memory (using a CTRL ALT DEL to display the Task List) and shut down items selectively to see if that would free

up the port, but still no joy. Booting from a DOS disk revealed that the hardware was fine, so he knew the problem was software-based. His last resort? Me.

After some consideration, I came to the blindingly obvious conclusion that some program was hogging the COM port. It couldn't have been any TAPI-based applications because they are co-operative and "yield" the COM port when requested. Loading a TAPI-based program, such as HyperTerminal, proved this much. Our problem lay in identifying the mysterious COM port hogger. Finally, I suggested a little tweak to force the errant program to reveal itself. Our columnist rebooted and found that it was Windows 98's Direct Cable Connection that lay at the bottom of all this endless grief. He'd been using a Windows CE 2.0 PDA, and when he installed the HPC software on the PC, it automatically activated DCC — but without telling him. And DCC is a "proper" program so there was nothing actually "wrong" with the system and no amount of diagnosis would reveal this existing "fault". Uninstalling DCC restored the modem.

So what had I suggested? A simple way to get a program to reveal itself is to force an error condition; at least you'd then get

a clue from the resulting error message. The way this was done in this case was to make the COM port unavailable. When DCC loaded invisibly at boot time, it checked that the COM port was available and when it wasn't, protested. The way to turn off individual devices in Windows 98, and Windows 95, is through the use of hardware profiles. Every Windows 9x PC has a default hardware profile and this includes all the devices in your PC. But if you examine the properties of that

device in Device Manager, at the bottom of the dialog box is a tick box, "Disable in this hardware profile". Tick, and the next time you reboot, that device will no longer be available. Actually, Windows 9x gives you some flexibility here, and allows you to set up multiple hardware profiles, a feature useful for notebooks which can have hardware devices available to it, depending whether or not it is attached to a docking station. To set up a second hardware profile, click on the Hardware

Profile tab, copy the default hardware profile and give it a different name. When you reboot you're given a simple menu of hardware profiles. You simply choose your new hardware profile as the default and disable/enable hardware as required.

The next time you select this hardware profile, your choice of hardware is enabled. When used in this way, hardware profiles can be an invaluable diagnostic tool.

NEW RELEASE: EZ-SCSI 5.0
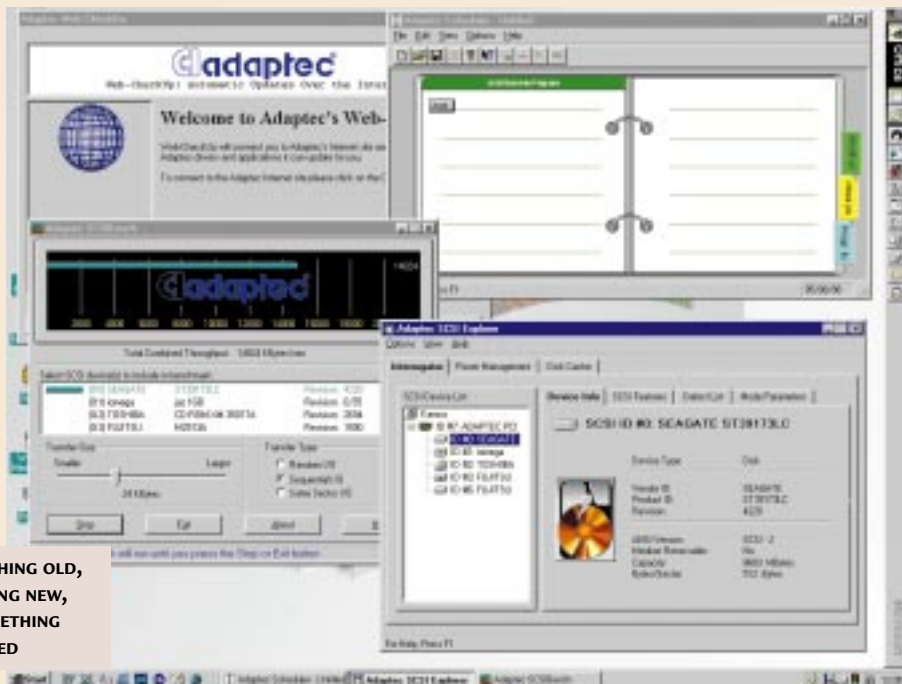
▶**SOMETHING OLD, SOMETHING NEW, AND SOMETHING BORROWED**

Adaptec kindly shipped me the current release of **EZ-SCSI, version 5.0**. EZ-SCSI normally ships with host adapter cards, though it is available as a separate retail product. It is without doubt the easiest way to install SCSI drivers: doing this manually, under DOS, used to make purgatory look attractive — until EZ-SCSI came along.

There are no big surprises with the new release — it's business as usual here. There are the obligatory updated drivers plus the normal suite of

useful utilities, including SCSI Explorer, which lets you examine all your SCSI devices and set things like power management sleep times and read/write cacheing which, amazingly, is sometimes switched off by default. You also get a simple SCSI benchmarking program which displays the relative data throughputs for your devices at various settings, definitely handy but not essential.

Adaptec has finally woken up to the potential of the internet and now includes an on-line driver

updater, called Web-Checkup. Sadly, I couldn't test this fully because EZ-SCSI installs the latest drivers anyway. You also get a buckshee copy of the CD-ROM burner, Easy CD Creator Lite, chucked in for good measure.

One interesting addition to the roster of utilities is Disk ImageSaver, a simple backup utility. However, it doesn't back up individual files; rather, it stores an image of the entire disk, sector by sector, on another SCSI device, which doesn't necessarily have to

be a tape drive, it could be a removable hard disk. Why back up an image? It's faster than a file backup and it's also convenient for certain kinds of tasks, such as machine cloning, disaster recovery or restoring a system configuration that's been changed. Disk ImageSaver creates a bootable DOS disk that restores the contents of the image backup. So, to clone a standard workstation that's been fine-tuned, you'd save an image of it to an external SCSI drive, then plug the drive into the new machine and boot from the DOS disk — and DiskImage Saver does all the rest. A scheduler is now included with EZ-SCSI 5.0 which allows you to automatically run the utilities, such as DiskImage Saver, at regular intervals.

A far more useful addition to EZ-SCSI is Drive Preparer. Normally, to add a new SCSI hard disk to your system you would have to get your hands dirty, quit Windows 9x and enter the "Dark Side", i.e. DOS, in order to partition and format it. With Drive Preparer, you can do all this and still stay within the comfort zone that is Windows 9x.

INSTALLING ULTRA 2 SCSI IN WINDOWS NT 4.0

Installing the AHA-2940U2W in my Windows NT 4.0 Server **called for some extensive preparation**. I was already using an AHA-2940UW card and a 2Gb Ultra Wide Fujitsu hard disk as my boot drive, plus sundry other SCSI devices. Swapping the drive from one SCSI host adapter to another wasn't a problem, but while installing the drivers I realised a "chicken and egg" problem would inevitably arise.

The server booted from this hard disk and clearly, the correct miniport drivers for the new card had to be in place for the card to be recognised and the drive booted from. With the new card in place, I'd be unable to boot Windows NT 4.0 and then install the required drivers. And the drivers for the new card weren't backwardly compatible with the old host adapter. And with the AHA-2940U2W post-dating Windows NT 4.0, it wouldn't have the drivers in its driver database — and so on. The problems just continued to spiral.

The solution was incredibly simple — you can have more than one SCSI host adapter in a PC. I downed the server and inserted the AHA-2940U2W card in a spare PCI slot. I then booted Windows NT 4.0 and ran through the Adaptec install routine to install the correct drivers. Having made sure that the new card was working adequately, I downed the server again, swapped the hard disk SCSI cable over from the AHA-2940UW to the AHA-2940U2W and removed the AHA-2940UW. At the same time I installed a 9.1Gb Seagate Barracuda U2W drive, and my server started to fill up with SCSI cables at an alarming rate. I finally rebooted, and all was sweetness and light.

Installing Windows NT 4.0 onto a blank Ultra 2 SCSI drive also calls for some gymnastics. Windows NT 4.0 doesn't support Plug and Play and so it uses a brute force technique to identify hardware — it loads all the device drivers it has into memory and tests them to see if they work, rejecting those that don't. Well, that's fine if the device drivers form part of the core drivers that NT comes with as standard, and in this case, Ultra 2 drivers are conspicuous by their

It is possible to get partitions bigger than 4Gb under NT, but it's a bit of a struggle

Ultra 2 drivers are conspicuous by their absence — you get a blue screen crash if you try and install

absence — you get a blue screen crash if you try and install. Unfortunately, there's no obvious "Have disk" option, similar to that in Windows 9x.

☞ **The trick is** to reboot again, and just after Windows NT 4.0 "signs on", you have a whole two seconds to press F6. This will pop up the screen that allows you to specify your SCSI host adapter.

☞ **You should** then specify "Other" and insert the floppy containing the correct SCSI drivers. This trick is also useful if, during installation, you want NT to use a newer host adapter driver than the standard ones that accompany Windows NT 4.0.

Irritatingly, Windows NT 4.0 isn't entirely happy with very large hard disks during setup. By default, on virgin hard disks, you're limited to a maximum partition size of 4Gb or thereabouts. Bizarrely, Windows NT 4.0 is capable of supporting partition sizes roughly twice this figure, 7.8Gb on the first hard disk. And even if you choose the NTFS, with the assumption that you'll get bigger partitions, think

again: it will install a FAT file system and convert it at the next reboot. So, either way, when you install a single 9.1Gb hard disk, you have no choice but to carve it up into smaller partitions.

The only way round this setup madness is to partition it first on another identical NT machine (subject to the maximum partition ceiling) and then switch it over to the current machine. Or another solution is to use something like Partition Magic, which I hope to look at in next month's column.

PCW CONTACTS

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Panel beaters

Have your cake and eat it, too: Cakewalk Pro Audio users can create or modify existing panels. Steven Helstrip shows you how.

StudioWare panels are arguably Cakewalk's finest feature, enabling you to control and set up track parameters or any MIDI device that responds to CCs (Continuous Controllers) and System Exclusive or MCI commands (Media Control Interface). Panels are included for many popular MIDI devices, from GS synths through to external audio workstations. If you use Cakewalk Pro Audio, it is possible to create or modify existing panels, although to start with we're going to tackle the basics of implementing and using them. Over the past two months in this column we've designed a mixer map for Cubase to control the AWE synth parameters; but how do you go about it in Cakewalk?

☞ **Choose File-Open** and select StudioWare from the file-type pop-up menu; the AWE panel is the first in the list. There are two ways to assign the controllers to any track: either position the track switch, which can be a tad tricky, or right-click in the panel to open the widget property box.

☞ **To record** your movements (known as automation) enable the record icon in

NATIVE ESSENTIALS: X MARKS THE SPOT

RECOMMENDED
PERSONAL COMPUTER WORLD

In the August column I looked at the low-cost EasyWaves bundle which included a preset-only reverb and combined EQ, compressor and gate module. TC Works' Native Essentials offers a similar line-up of three separate components: Q equalisation, R reverb, and X dynamics. The accompanying literature boasts that these are the most processor-optimised algorithms to date, so if the TC Native Reverb plug-in is anything to go by, we're in for a treat.

Q features three bands of EQ which can be configured as either high/low shelving filters, notch or parametrics with a +/- 18dB range. Perhaps the most intriguing device here is the joystick controller, which enables you to sweep through the frequency spectrum with configurable gain.

Digital EQs are generally considered to be a tad harsh, or cold, when compared to their analogue counterparts, so TC has come up with an algorithm to smooth the edges. Called SoftSat, it works by applying a soft harmonic distortion and prevents digital clipping. This enables you to boost sensitive frequencies all the way up to 18dB without

experiencing undesirable clicks in your audio.

X can be configured as either a soft or hard knee compressor and features automatic gain make-up, bringing material right up to 0dB. This makes off-line normalising redundant and is a great timesaver. Parameters for attack, release, threshold and ratio are offered and SoftSat can be switched-in to provide warmer-sounding compression.

R is based on the Native Reverb package mentioned earlier and offers 18 presets with adjustable decay and mix. There's every type of reverb you could wish for, from room to cathedral ambiences with both bright and dark settings. The quality is stunning for what is effectively a £50 reverb, and long decay times sustain the source material with remarkable detail.

Native Essentials sounds as every bit as good as it looks and could become the standard plug-in suite for users on a budget. It has all the essential ingredients: high-quality effects, minimal processor overhead, flexibility, and great value for money. A demo can be downloaded from www.tcworks.de.

Price £149 (£126.80 ex VAT)
Contact Arbiter Pro Audio
0180 207 5050

★★★★★
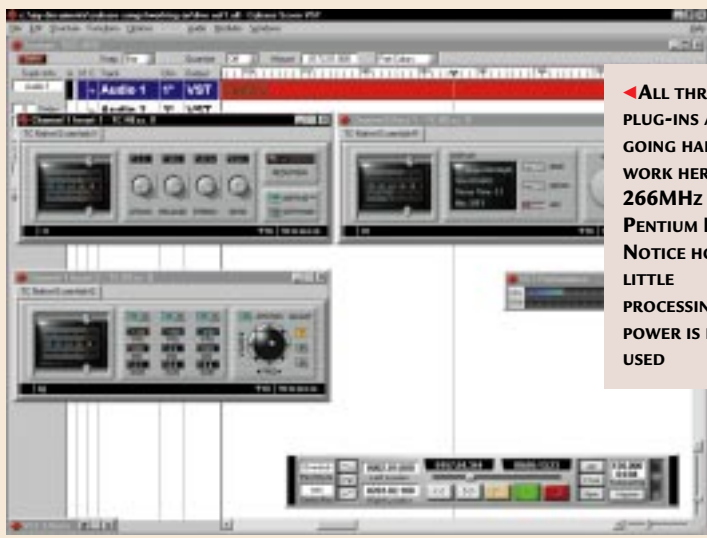
◄ALL THREE PLUG-INS ARE GOING HARD AT WORK HERE ON A **266MHz PENTIUM II.** NOTICE HOW LITTLE PROCESSING POWER IS BEING USED

Questions & answers

This month's Q&A has one more question than I have answers for. Reader Mike Newell has a problem that has baffled the technical help department down at Et Cetera Distribution, and now myself. He writes:

Q I have a Midi-edge 1 x 4 MIDI interface card which has a Yamaha DB50XG daughterboard on it. This works superbly with both Cubase and Cakewalk to provide superb-quality sounds. However, I cannot use it for digital audio playback so I have tried installing a bog-standard SoundBlaster card. But when I do so, the Midi-edge refuses to work, claiming that whatever port and IRQ settings I use are wrong. I have tried *every possible* combination on the card, using the jumpers. Both cards work fine on their own, but not together, even though they have independent IRQs and port settings. Any ideas?

MIKE NEWELL
g1hgd@aol.com

a In theory there is no reason why you cannot get these cards working in the same PC and I'm convinced somebody, somewhere has already done so. After all, they're not an unusual combination. If anyone can help, or has a suggestion, please contact Mike.

Q I am confused about sub-woofers. What are they, and is it worth getting one if I am interested in composing and listening to music on my PC?

A ATKINSON

a A sub-woofer is a loudspeaker that is dedicated to reproducing the very lowest sounds that we can hear; anywhere from 20Hz to around 200Hz, depending on the model. Many of today's so-called multimedia speaker systems comprise a sub-woofer that is designed to sit on the floor, and two "full-range" satellite monitors which should be positioned at ear height. When producing commercial music it is important to have accurate sub-bass monitoring to get a feel for how the mix will sound in a club or arena environment, but really, investing in a sub-woofer merely for home use is sheer indulgence. However, if you need deep and powerful monitoring, which can greatly enhance video and games too, a sub-woofer could be just what you're looking for.

▶**VISIT YAMAHA'S XG WEB SITE FOR INFO ON EFFECTS, SPECS AND XG PRODUCTION TIPS**

Q My son uses his computer to construct music using Digital Orchestrator Pro, a Turtle Beach Tahiti sound card and the Yamaha DB50XG daughterboard. He is experimenting with the MIDI effects and, according to him, there are 50 of them. But he seems unable to find a description of what they do or how to use them. Where can he find this?

NILS ANDREAS ERSTAD

a There's some useful information on Yamaha's XG web page at **www.yamaha.co.uk/xg/reading** which explains all there is to know about accessing and using effects.

▶**TWO STUDIOWARE PANELS IN CAKEWALK, CONFIGURED FOR THE AWE-64 AND ROLAND'S SOUND CANVAS**

the panel and continue to record as normal. The icon to the right, which looks like a mini-fader, turns on the widget update to play back your movements in realtime.

☞ **It is often useful** to group widgets to allow you to control, for example, the volume of multiple tracks simultaneously. Groups are created by selecting two or more widgets with the Control key. Any widget can then be used as the "master" fader and all grouped widgets will move, relative to their start and end positions. They are defined by positioning a widget with the shift key: if the entire group is closer to the maximum value, you also set the maximum value for that widget, and vice-versa.

☞ **Crossfades** can be achieved by setting widgets off in opposite directions. First, select the two faders and position them at their mid point; create the group and move both to their highest position. Then, with the shift key, drag the second fader to its lowest position and move the first fader to *its* lowest position without shift. Finally, with the shift enabled again, drag the second fader to its highest position, and hey presto!

Piece of cake

Panels which include complex graphics can really grind slower machines to a halt, particularly when it comes to screen redraws. So, in order to disable graphics, add the following line to the [WinCake] section of the Cakewalk.ini file:

```
PanelsShowBitmaps=0
```

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Plug-in perils

**Beware those forgotten extensions, temporarily loaded:
they can cause all sorts of cross-platform infestations.
Ken McMahon relates his own tale of woe and finds some fixes.**

This month it's my turn to ask you lot for help. I was producing a brochure for a client who, for reasons best known to themselves, decided to have the cover produced elsewhere. When the cover arrived — a Quark XPress 3.32 Mac document — we were unable to open it without loading a couple of extensions, Resize XT 1.1.3 and Scitex Polygon 3.1. Of course, I forgot to remove them from the extensions folder afterwards, and every document I subsequently saved will not now open without the extensions present.

On the offensive

This is tantamount to a virus infection. We cannot send our "infected" Quark files to the output bureau without the offending extensions present, and this exposes the bureau and all of its other customers to the same problem. The last time something like this happened was with a nasty piece of work called Pasteboard XT which provided the not very staggering improvement of a large pasteboard area. Then someone came

up with a lifesaver called Pasteboard Xterminator which, if present in your Quark extensions folder, allowed you to open Pasteboard "infected" documents. The problem travels across platforms, so if someone sends you a Mac Quark file created with any of these monsters, you won't be able to open it on a PC. You can get both Mac and PC fixes for Pasteboard at www.markzware.com.

The Scitex ones are more of a problem. I have a Mac workaround; anyone who's interested can email me for details, but this doesn't help if you want to open an "infected" Mac file on a PC. Pasteboard is available in PC format; as far as I'm aware, the Scitex ones are Mac only.

Finally, on the subject of Quark plug-ins, by the time you read this, **version 4.0 of Extensis QX-Tools** will be available for Windows (95, 98 and NT4) and MacOS. QX-Tools is a nifty suite of plug-ins which includes things like group scaling, palette docking and attribute find-change. The last one is a dream for changing all your box line weights at a stroke — and it only costs £99.

▲ You can get your very own David free of charge from Photoempt
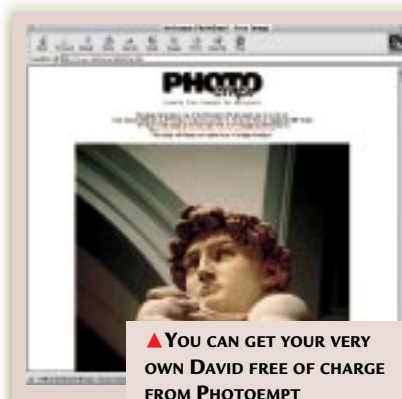
PICTURE THIS

Still looking for that elusive image of a church door, autumn leaves, a Tuscan landscape or a suburban semi? Then Photoempt's collection of royalty-free images could be the answer to your prayers. At the moment they've got a mere four-CD collection, each with 100 images at 800x600 pixels. Each CD costs $99 (Canadian) which is about £40, and you have to phone or email to order. Repro-resolution images are available individually. Photoempt will never compete with the likes of Corel, Photodisc or Digital Vision in terms of volume or service, but you can't have too many sources of good pics, and there's a free sample, changed regularly, on the web site at www.rjsid.on.ca/photoempt.htm.

SWISS ROLL

Mike Godfree's solution to the mappers problem raised by Ian Cargill in the July issue is to use a Swiss application, OCAD, designed for orienteering. "The user can define his or her own symbols and the Win95/NT version (OCAD 6) has a set of symbols for city maps and tourist maps. Demo versions can be downloaded from www.ocad.com and the only limitation is a maximum of 500 objects, which is probably adequate for the type of map Ian Cargill talks

about. Version 6 allows tracing of a template in bmp format but does not allow the use of a digitiser. Version 5 allows a digitiser as well as tracing over a template, will run on Windows 3, but does not have the extra pre-set symbols. The main advantage is the small size of the program and the subsequent speed. Full versions cost around £250 (it is priced in Swiss francs)." The developer has even written an interface for GPS receivers, so you can create your own maps "in the field",
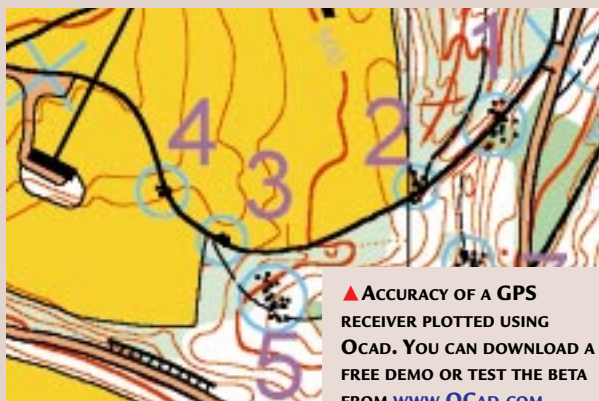
as it were. The results of his tests, which are on the web site, show an accuracy of, at best, plus five metres and, at worse, plus 25 metres. Clearly room for

▲ Accuracy of a GPS receiver plotted using Ocad. You can download a free demo or test the beta from www.OCad.com

improvement if you don't want to find yourself in a river when you should be in the bar of the pub next to the church with a steeple.

Questions & answers

Q I have around 400 fonts on my Windows 95 machine. They don't appear to slow things down as they did under Windows 3.x, but that really is an unmanageable number. Even with font management software, I cannot face going through and comparing all those fonts, a slow and inexact process if you do not have wide experience of the subject. Is there a useful working set that would cover most bases without excessive duplication?

DAVID THORPE

a The trouble with the Fonts folder is that it does have a tendency to grow unnoticed, particularly if you frequently install new packages which come with free fonts. The problem is exacerbated by the way TrueType font files are displayed. One font will usually have at least four "styles" — roman, 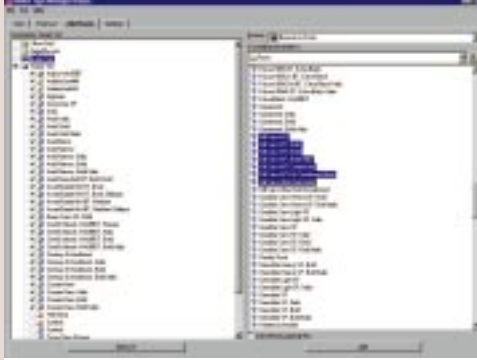italic, bold and bold italic, each with a separate font file. Fonts like Universe, which come with more weight variations than you're likely to want to count, pose even more of a problem.

A quick way to make things look tidier without actually deleting fonts is to hide the numerous variants that make up a particular font family. In the control panel, double-click the fonts icon and simply select <hide variants> from the View menu. If you want to actually remove the fonts so that they don't appear on application fonts menus, play safe by copying all of your fonts into another folder
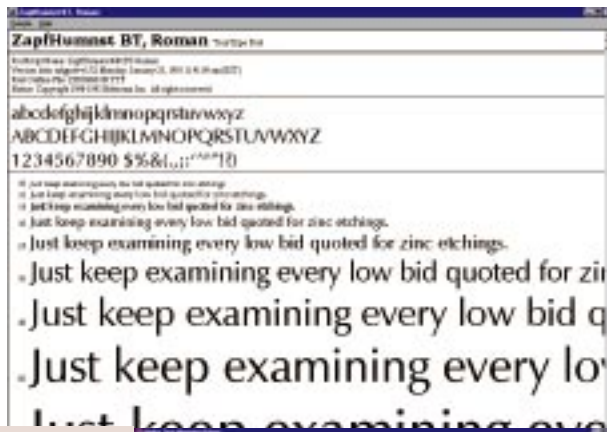
▲**ATM LETS YOU CHECK OUT FONTS BEFORE INSTALLING THEM — HANDY IF YOU'RE LOOKING FOR A FACE THAT FITS** ▶ **YOU CAN SET UP DIFFERENT SETS FOR DIFFERENT APPLICATIONS AND KEEP YOUR FONTS ANYWHERE YOU WANT. YOU JUST DRAG FROM THE RIGHT WINDOW TO THE LEFT TO ADD FONTS TO THE SET OF YOUR CHOICE, AND ACTIVATE SETS SIMPLY BY CHECKING THE BOX**

before removing any from the Fonts folder using the Fonts tool. If you later decide to reinstall the removed fonts, select "copy fonts to the Fonts folder" option. If you don't do this and subsequently remove the font a second time from the Fonts folder, you will no longer have a copy to restore. A far better option in my view would be to get yourself a copy of Adobe Type Manager Deluxe 4 which, among other highly useful things, allows you to easily manage all your TrueType and Type 1 fonts without having to mess around copying them from one folder to another. ATM lets you install and uninstall typefaces using a

drag-and-drop interface and allows you to create custom sets of fonts that launch at start-up, with a particular application or a specific file. So if, like me, you only ever use Word to write things without formatting them, you can configure ATM to use only a very basic font set. You can tell it to launch a more comprehensive set with your page layout application, to load your company fonts when opening any stationery files, or a special web font set when you launch your browser or web authoring package.

ATM also simulates missing fonts using Adobe's Multiple Master font technology, has its own Type 1 smoothing engine, allows you to print font samples prior to installation, and improves output to non-PostScript printers. For £49

for the full version and £35 for an upgrade, it's undoubtedly the best way to get your TrueType and Type 1 fonts organised.

Q Can you give me any information on colleges that offer desktop publishing and graphic design courses? I am currently employed by a local publishing house as a DTP operator and would like to extend my limited knowledge of PageMaker 5 and CorelDraw 6.

LINAH@AWS.GAIA.CO.ZW

a I just couldn't resist the challenge of tracking down some course information on the web, so I tried hotbot with the string +"higher education" +courses +UK +graphic design" and came up with 241 matches, including the Government's National Grid for Learning web site at www.ngfl.gov.uk. This place is a mine of information. You have to complete a very short registration form to access the site, but the links that the search engine throws up are well worth the effort. I was quickly able to track down information on institutions offering higher education courses in graphic design and related subjects, course information on NVQs in design, reviews of software on the curriculum, information about exam bodies (tip: don't type examination bodies into the subject field of a search engine — it won't yield what you expect) and links to other useful resources.

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Object of the exercise

Benjamin Woolley shows you how to achieve dramatic results when creating complex objects.

In the very first *Hands On 3D Graphics* column, I described the building of a piece of virtual architecture using "Boolean" operations. Booleans are essential to creating many complex objects, but can be complicated to use. So I thought, as it is so long since their first appearance in these pages, they might be worth a more detailed consideration.

Booleans get their name from George Boole, the British mathematician who in 1847 made the connection between mathematics and formal logic that is now such an essential feature of computing. The connection between Boole's mathematical tooles (sorry, *tools*) and 3D graphics is an obscure one, and not really worth exploring. The point is that they provide a method for combining 3D objects — "operands", as they are called in a Boolean context. There are three types of Boolean operations: add (sometimes called "union"), subtract (or "difference") and intersect. When you add two operands together, two objects are joined to form one at the points where their surfaces intersect. Polygons that overlap are

> ## Often, the software will turn your lovely original into something that looks like it's been through a metal crusher

deleted. Intersect deletes all the polygons in both operands except those that overlap. Subtract removes the volume of one operand from the other.

Using a combination of these three operations, you can create very complex objects very quickly. The subtract operation, for example, can be used to chip away at an object, as a sculptor might a piece of stone. The intersect operation is like moulding, using one shape as the die, the other as the moulding material. The add operation is

like welding, enabling you to build up complex shapes by sticking together simpler ones. There are problems with Booleans, though. You have to treat them with great care, otherwise you might end up breaking objects rather than creating them. The most basic problem with Booleans is that they change the actual geometry of the operands, the objects being operated upon. An add operation between two overlapping objects — for example, two cylinders at right angles to one another to create a sort of cross — results in a single object that is superficially identical to the originals from which it was made.

On the edge

But you will soon find that when you start to inspect the underlying wireframe mesh, a lot has changed. To begin with, the software will have created new edges where the shapes once intersected, and these could be untidy, and in the process removed all texture mapping information (i.e. the information that describes how a 2D texture should be wrapped around the 3D object) will have been lost.

Therefore, if the operands with which you started had complex maps, perhaps intrinsic ones generated when you originally built the objects, you will have to recreate them. Another challenge you will face with Booleans is ensuring that the resulting geometry hangs together. Quite often, the software will turn your lovely original into something that looks like it's been through a metal crusher. The most common cause of this sort of problem is where faces or vertices are almost identically aligned, so the software cannot decide which co-incidental elements should be combined, which preserved, and which deleted. Subtractions that involve

punching a hole in an object can be particularly difficult if the meshes are complex. Quite often you will find a stray face or even marooned vertex left behind in what was supposed to be empty space.

Subtractions produce another problem: unexpected results. Unlike an add or intersect operation, the result of a subtraction is dependent on the order in which you do it — which operand is to be subtracted from which. You will find yourself getting the order wrong, and producing the exact opposite of what you wanted. Once you are aware of such problems, though, you can start to deal with them. The most important precaution is to ensure that, before performing any Boolean

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BABY LOVE

From the moment I first saw it, I knew "Baby Cha-cha" was destined for greatness. With the original release of "Biped", a plug-in for 3D Studio MAX designed to help animate bipedal characters, came a file which showed how to copy the steps or movements used to animate one model, to another. This was demonstrated by applying the cha-cha step originally developed to animate a model of an adult dancer, to a baby. The result was a sensation, a tiny toddler wearing a nappy swinging its hips with all the abandon of a Travolta impersonator. Now, following Baby Cha-cha's appearance on Channel 4's *Ally McBeal*, Autodesk's PR company has put together a sequel and here are some of the frames from it. This time the baby really gets into the swing of things, doing everything from aerobics to kickboxing.

operation, you keep copies of the original objects, either in a separate file or, if the software supports it, in a clipboard. With many 3D authoring packages, it is usually impossible to recover the original geometry if things go wrong.

☛ **Having a backup** of each object operand can pay dividends when it comes to building new map co-ordinates for the object you have created. For example, some software allows you to copy, or acquire mapping co-ordinates from one object and apply them to another. If this is the case, you could simply copy the co-ordinates from a backup of one of your original objects and re-use those.

☛ **A much bigger challenge** is dealing with Booleans that do not work because the geometry of one of the operands clashes with the geometry of the other. One method of dealing with this is to prepare the operands for the operation about to be performed upon them.

☛ **Make sure** that the mesh of each object is properly constructed, that

there are, for example, no stray faces or overlapping edges. These will arise if you have already edited the mesh, so keep any changes you make to any of the operands to an absolute minimum, and always carefully check the geometry after each change. Better still, start with primitives (shapes generated automatically by the software), as they will have valid and simple geometry and are likely to behave in a far more predictable fashion when you perform Booleans upon them.

Snap to it

One good trick is to build up a sort of toolset of basic objects to use in Boolean operations: a cylinder to punch holes, for example, a prism to cut grooves, or lettering made with a diamond-shaped cross-section to engrave words. Use alignment and snap commands to make sure the tool is accurately positioned with respect to the object being operated upon. If, for example, you are using the pyramid to cut a groove of a fixed depth

in, say, a block, make sure the pyramid's "cutting" edge is exactly parallel with the surface to be grooved.

One final consideration is to make sure that you do not use Booleans except where they are necessary. Add operations can often be avoided simply by grouping the objects that were going to be added together in some other way. Sometimes it's a good idea to use subtract and intersect operations to create a rough template of the geometry you are after, and then hand-craft a finished version.

Don't be put off experimenting with Booleans — they can produce dramatic results with minimum effort. Just make sure that you handle them with care.

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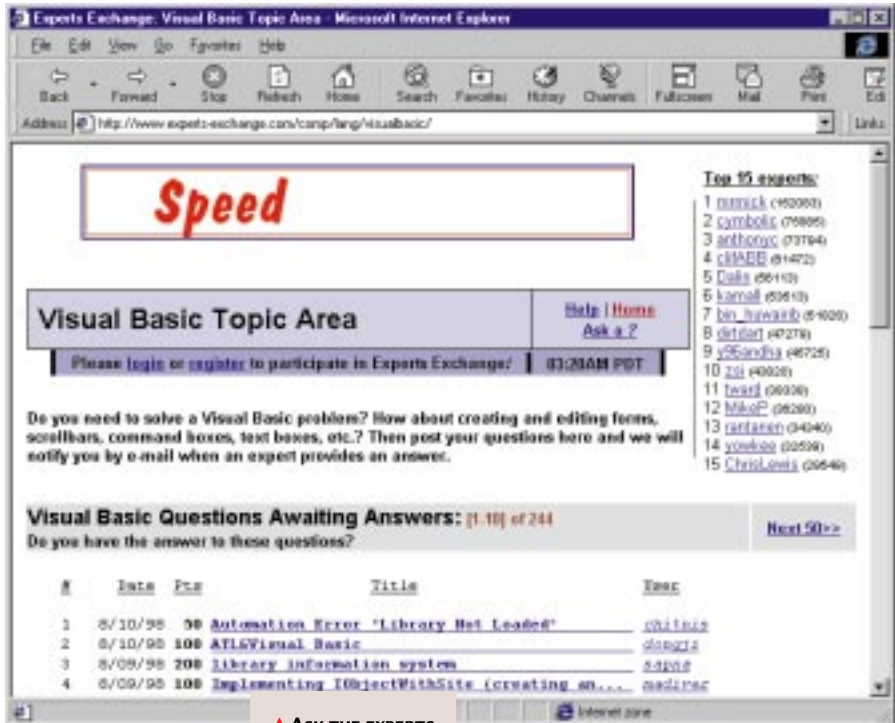▶**STILLS, COMPLETE WITH MOTION-BLUR, FROM THE CHA-CHA BABY'S NEW ANIMATION. NEXT STOP, HOLLYWOOD**

Help is at hand

Tim Anderson investigates the best avenues of help with tricky programming matters, using hints, tips and solutions from readers.

Developing software is a curious mixture of simple and easy visual programming, with the labyrinthine complexity that lies beneath. Few products now come with chunky manuals which disguise the vast size of their programming languages, class libraries and complex development environments. Most of us have to deal with Windows as well: the original API, already notorious for its complexity way back in version 3.0 days, now pales in significance beside the vast arrays of database APIs, COM documentation, and specialist APIs like TAPI, MAPI, ISAPI and a whole lot more. Next, I should mention the internet RFCs, essential for serious web development, along with HTML, Dynamic HTML and XML.

Debate débacle

That means we all need help. Newsgroups are great, but many questions go unanswered and you soon tire of the endless circular, repetitive debates, usually about Microsoft and

Java. Incidentally, the vendor-specific groups are usually better, particularly those run by Microsoft and Inprise, if you are after technical help rather than debate. But newsgroups are hardly sufficient. Expensive support contracts, or paid-for support calls, may be part of the answer for corporate sites, but ultimately even these have limitations. The service is not always quick, and the quality of support is variable. Here's a quick look at some other possibilities:

☞ **Experts Exchange**
Reader Matt Baker writes: "I think you could

▲ ASK THE EXPERTS IS A GREAT IDEA IN PRINCIPLE — UNTIL YOUR MONEY RUNS OUT, THAT IS

◄ BORLAND TIP LOOKS USEFUL, BUT IT'S NOT A PATCH ON MSDN

plug the Expert Exchange in your column, as I find this a useful source of advice. It is at www.experts-exchange.com/."
I took a quick look at this site, which is a regulated version of what often happens on newsgroups but with a commercial twist. You can ask questions and read answers not only on programming topics, but also many others. If you have more answers than questions, then you can sign up as an expert and eventually get paid for your answers. The snag is that although basic access is free, there is a limit to how many answers you are allowed to read, unless you pay. It is an interesting approach if you cannot stand the hurly-burly of newsgroup life, or hanging on the telephone for support.

☞ **Borland Tip**
Regular readers will know my great enthusiasm for the **MSDN (Microsoft Developer Network) library**, a CD of Microsoft's documentation and knowledge base for Windows, and all its other professional products. And although the subscription is expensive, much of it is freely available on Microsoft's web site if you can get a good connection. The library is also shipped with all the language
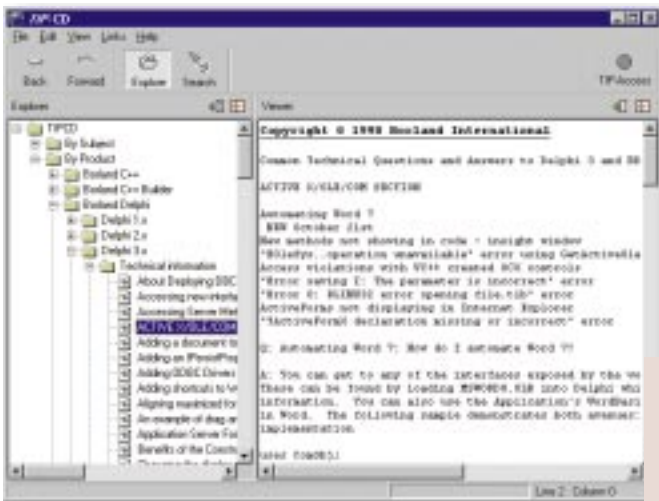
products including Visual Basic and Visual C++. In the latest Visual Studio, it is completely integrated with online help. For some time I have hoped that Borland/Inprise would come up with something similar for Delphi. The CDs from the Borland Developer Conference are usually made available but conference CDs are rarely useful, except as a memento for delegates, because the presenters do not have time to create proper online versions of their sessions.

I was interested, therefore, in a new initiative, Borland Tip. Like MSDN, this is on subscription and provides an information CD with the data mostly stored in a Paradox database and viewed through a BDE-based viewer. There are product patches, links to an online Tip site, and email posting of technical news. Inprise should be encouraged, but I do have some reservations. Like most serious Delphi developers, I had already downloaded all the TI (Technical Information) sheets freely available from the Inprise web site, and much of the first Tip-CD seems to

If you are a Windows developer, whatever you do, do not get Borland Tip instead of MSDN

duplicate these. Also, it is not clear to me why Inprise has devised yet another document-viewing application when there are other good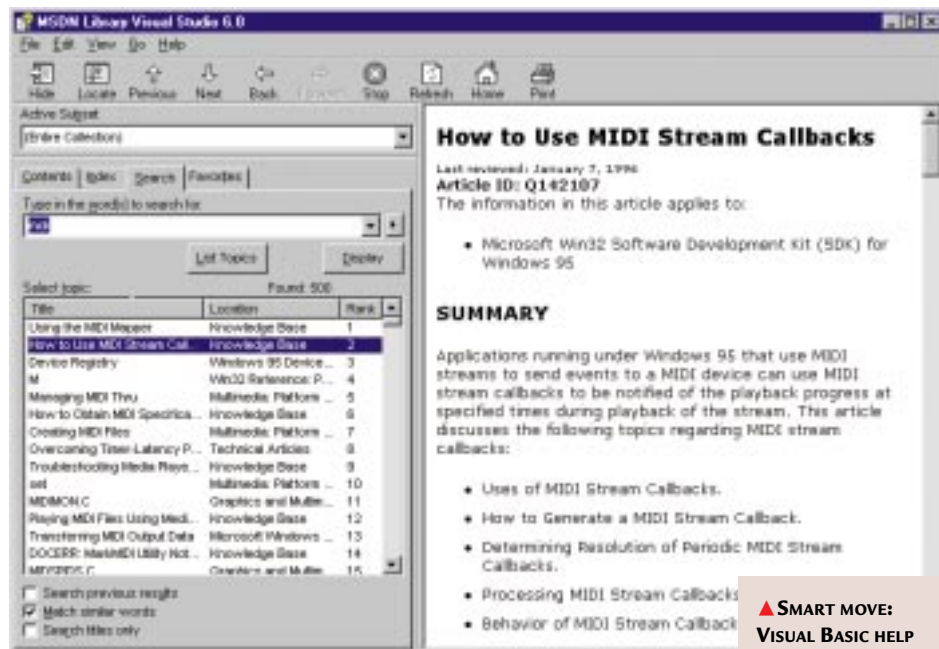 (or even better) ones already available — not least the humble Windows help. And, it strikes me that Inprise can only benefit if people know how to use its products, so the relatively high subscription price

surprises me. Why not make it a nominal price? If you are a Windows developer, whatever you do, do not get Tip-CD instead of MSDN. To take an example, there is nothing useful on the first Tip-CD about programming MIDI, while MSDN has a number of hands-on articles. Although MSDN has never heard of Delphi, many queries turn out to be Windows queries rather than anything specific to a particular language or product. Even so, Tip has great potential if Inprise is serious about making it good.

▲ **SMART MOVE: VISUAL BASIC HELP NOW INCLUDES THE WHOLE DEVELOPER NETWORK LIBRARY**

THE NAME OF THE GAME

Thanks to David Brown, who has written a **detailed letter about naming conventions**, part of which reads: "I am convinced that the single most important aspect of programming is using well-chosen names. If a program is written with well-chosen names for types, variables, procedures, modules, components, and all other identifiers, it is at least half-way to being a 'good' program. If it is written with names like 'form1', 'edit1', and 'temp', it is guaranteed to be a 'bad' program. By 'good', I am referring to programs which are easy to work with, understand, modify and update.

"It is important to be consistent with names, but conventions used are

ultimately a matter of personal programming style. I generally tend to use the Hungarian convention ('edtFirstName', 'lblTelephoneNo', etc) for components; for normal variables, I always start the names with a small letter; procedures and functions I name with an initial capital.

"It is a common misconception that the key to readable code is the good use of comments. In fact, good layout and well-chosen naming systems make comments almost unnecessary. For new programmers, it is difficult to see the need for proper names since most documentation and books use the default 'Edit1' names — this is unforgivable laziness on the part of the authors. In your column, you

have the opportunity to reach many beginners and experts, and thus I would urge you strongly to promote the use of naming to help people improve their programming."

David is too polite to say so directly, but I generally use default component names in this column. It is not just laziness, since the default names have the advantage of making it quicker for you to reproduce the example, as well as making it obvious what the controls are. For instance, you will know that Edit1 is an edit box, while Label1 is a label.

But I agree that well-chosen names are essential to good code, although, it has to be said, not everyone likes "Hungarian".

Questions & answers

Q I have been programming in VB for about five years but just recently have started writing a database application. I can select an entry from a ListBox (list of names from a field in the database), pass the selection to an SQL statement, and display the data. I have a problem when the selected text includes a single quote (e.g. O'Reilly). This produces an error. I reckon this is due to the single quote mark in the name, but how can I overcome this?

GEORGE MCNANEY

a *There are a couple of ways around this kind of problem. First, in this scenario it is not clear to me why you would need to include the name in the SQL string. From what you say, I guess you have the list box bound to a database table, and the user clicks on a row to reveal more data for the chosen record. Rather than using the name field to identify the record, it would be better to use an ID field like a number or code.*

Set the properties of the databound listbox as follows: Rowsource: The data control bound to the address table. Listfield: The field for display in the list, in this case Name. BoundColumn: The ID field. Now your search can be something like this (as one line of code):

```
sSQL = "SELECT * FROM
addresses WHERE
AddressID = " &
DBList1.
BoundText
```

But coming back to your original question, there are certainly occasions when you need to search by a character string which may contain awkward characters such as

quotes or other delimiters. *Sometimes you can fix it by using the Chr() function to force VB to include the character in the string. For example (one line of code):*

```
sSQL = "SELECT * FROM
addresses WHERE Name
= " & Chr(34) &
DBList1.Text &
Chr(34)
```

Chr(34) returns a double quote. Of course, this would still fail, though, if the name itself contained a double quote. It may be unlikely, but the best applications usually allow for such scenarios. The solution is to double-up the problem character.

JET SQL has a feature whereby if you are using a single quote as a delimiter, it treats two single quotes as if they were one literal, single quote. So, if you search for O''Reilly, you will find O'Reilly. The same applies to the double quote.

It all gets messy because VB itself follows similar rules. It won't be obvious, when looking at a line of code, which characters are literal, which are VB delimiters or which are SQL delimiters. To achieve perfection, proceed as follows:

☞ *Decide which character to use as the SQL delimiter.*
☞ *When you are assembling SQL strings, use the Chr() version of your delimiter. Chr(39) gets a single quote, and Chr(34) a double.*
☞ *Check the value you are searching for to see if it contains the delimiter character. If it does, double it up using VB's string functions. If you have VB 6, you can use the new Replace function.*

As an example, the following will find the value 6"1', say, in the height field of a doctor's patients table (again, one line of code):

```
sSQL = "SELECT * FROM
patients WHERE
```

```
Height = " & Chr(34)
& "6" & Chr(34) &
Chr(34) &
"1'" & Chr(34)
```

Q Inspired by your Hands On colleague, Steven Helstrip, I've decided to write a small utility in Delphi that lets me alter the parameters of my Yamaha SoftSynth (wavetable software). However, the Delphi help system doesn't include examples of how I should go about sending messages to the MIDI device. In particular, I'd like to alter parameters for Resonance, Reverb, Chorus etc, possibly while a separate piece of software plays a MIDI file. I'm using Delphi 1.

JONATHAN WHITE

a *Since Windows 3.1, the Windows API has offered two ways to control multimedia devices. The first is called MCI*

(Media Control Interface) and is nice and easy. MCI treats WAV files, MIDI files and CD Audio as varieties of multimedia device that can each be opened, played and paused, for instance. All the MCI functions are prefixed mci. For MIDI files, you can think of MCI as an interface to a simple sequencer; easy to use but unsophisticated. Delphi's media player component is an encapsulation of MCI. Devices are identified by a DeviceID, which is why TmediaPlayer has a DeviceID property. The API function mciSendCommand or

mciSendString gives you a certain amount of control, for instance, over the tempo.

When MCI is insufficient, you can use the low-level MIDI Audio services. For example, there is MidiOutOpen to open a MIDI device, MidiOutShortMsg to send a standard MIDI message, and MidiOutLongMsg to send multiple MIDI events and system exclusive messages. For Windows 95 and NT, you should also look up the MIDI stream functions. To use them, you will need a good knowledge of MIDI and a reference that applies the MIDI device you are using and any system exclusive messages it supports. There is no problem with using these functions from Delphi and they are declared in the unit MMSYSTEM.PAS.

There is a problem with documentation, though, particularly as the Delphi 1 Windows API help does not include the multimedia API.

It is included in the Delphi 3 and 4 help files, although in version 4 Inprise seems to have given up preparing Delphi-specific versions, simply shipping the standard Microsoft API help.

PCW CONTACTS

What's in a name?

A good naming scheme, with a DNS server, is the most efficient way to provide automatic addressing and naming services on a Windows network. Bob Walder shows you how to do it.

In a recent issue, we went into some detail on IP addressing and the use of WINS and DHCP to provide automatic addressing and naming services on a Windows network. Since then, I have received several emails asking me to do a follow-up piece on DNS in Microsoft environments — so here goes.

Domain Name System is the cornerstone of the internet, since it provides the means to turn all those long-winded IP numbers into equally long winded-names — but at least they are easy to remember. For instance, how many of you know the IP address of the Novell web server off the top of your head? Try dropping to a DOS prompt and type ping.www.novell.com. After a pause, you should see a reply from 137.65.2.11. If you had typed PING 137.65.2.11 in the first place, you would have got exactly the same result, but marginally quicker. That is because the first thing that happens when you try to PING a domain name is that it must be resolved by a DNS server.

The simplest way to provide name resolution in small networks is to use the HOSTS file. This is a text-based file which can be found on most TCP/IP systems, and which contains a simple list of IP addresses and the names that relate to them [Fig 1]. This file can name common systems both inside and outside an organisation and each address can have several names, usually a "formal" name followed by a number of less formal "nicknames" or aliases. Hence, in our sample HOSTS file, the marketing server can be referred to by its IP address of 10.1.1.2, its full name of dilbert.marketing.acme.co.uk, or by its shortened aliases of Dilbert or Marketing. While the use of HOSTS files is possible in smaller networks, they can have serious drawbacks in larger ones.

The main problem is that a copy of the file must exist on each and every TCP/IP client which intends to refer to resources by name rather than IP address. This approach is obviously not very scaleable

► **FIG 2 DNS CONFIGURATION TAB**

DNS provides for central control over names and IP addresses

and presents systems administrators with a potential nightmare in a network with hundreds or thousands of clients. Ensuring that each and every HOSTS file is always up to date as network changes are made is bad enough, but there is also the temptation for users to create their own files with customised naming conventions, making it difficult for "hot desking" colleagues. Of course, it is possible to manage HOSTS files by keeping a master version on one of the central servers, and downloading it to clients automatically on a regular basis, but this approach, too, can have its problems in large distributed networks.

Obviously, such solutions will not scale in large organisations and certainly will not scale to the internet. The problem of internet naming has, to date, been largely satisfied by DNS which allows a computer that is registered to the internet to be uniquely identified by that name wherever it may be located. Because computers work with numbers rather than names, the second major function of DNS is to translate the unique host name into the appropriate IP address required in order to establish communications.

The use of DNS is certainly mandatory in some form if you wish to participate in the internet. However, a good naming scheme coupled with the implementation of DNS servers can also make life considerably easier for users of a large corporate TCP/IP network, even if it is not connected to the internet. DNS provides for central control over names and IP addresses and removes the need for individual HOSTS files — although these can co-exist quite happily where required. It allows control to be applied both in a distributed fashion and where it can be most effective, in local sites and divisions. The domain name protocol is quite complex syntactically, although its operation is straightforward. A

[FIG 1]

```
; Hosts
;
; IP address    name                          alias
;
127.0.0.0       loopback                      Bob
10.1.1.2        dilbert.marketing.acme.co.uk  Dilbert Marketing
10.1.1.3        dogbert.sales.acme.co.uk      Dogbert Sales
10.1.1.5        ratbert.accounts.acme.co.uk   Ratbert Accounts
10.1.1.10       bwalder.acme.co.uk            Bob
192.168.1.52    bgates.microsoft.com          Bill
```

host, given a name, asks the server for a name-to-address translation. If the name server does not possess the means to perform that translation directly, it will pass the request on to a server with a higher authority than itself. This process can be repeated until the request is satisfied, which will always happen unless the requested address was incorrectly specified or there is some unforeseen problem, such as a DNS server being temporarily unavailable. Those of you with internet connections will have one or more entries in the DNS tab in your Network configuration [Fig 2, p299]. This will provide you with everything you need to resolve all those addresses out there on the internet.
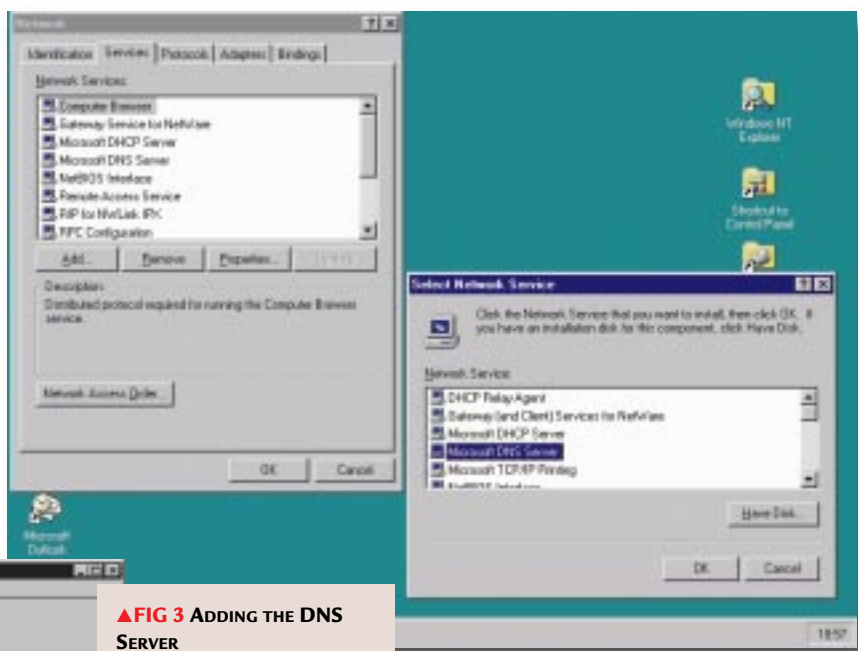
FIG 3 Adding the DNS Server
FIG 5 Adding Hosts
FIG 4 Creating your first DNS server
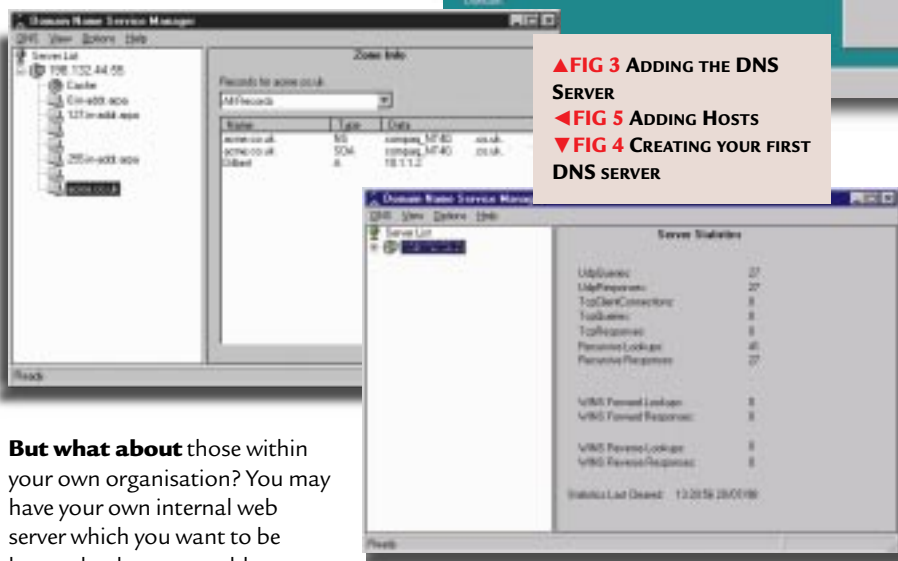
But what about those within your own organisation? You may have your own internal web server which you want to be known by the memorable name of DILBERT rather than the slightly less memorable address 10.1.1.2. Luckily, it is easy to add your own DNS server in a Microsoft site, since the appropriate software is included with NT Server 4.0 (prior to this, you had to rely on a rather lacklustre offering in the Resource Kit for 3.51). One nice feature of the Microsoft product is that it hooks neatly into WINS if you already have WINS servers configured. DNS configuration can be quite complex, unfortunately, so I am going to concentrate on the absolute basics to provide internal naming services.

☛ **Call up** the Control Panel on the server and double-click on the Network icon.

☛ **Click Services,** Add, and select the Microsoft DNS Server [Fig 3].

The use of DNS is mandatory in some form if you wish to participate in the net

☛ **Supply** the path to the installation files and reboot your server when finished.

☛ **Once the server** has rebooted, go to Start, Programs, Administrative Tools (Common) and the DNS Manager.

☛ **Click on DNS,** New Server and provide the IP address of your new DNS server. The database files are initialised and this address then appears in the Server List in the left-hand pane [Fig 4].

A number of zones are automatically created and can be ignored for now. Your first job is to create a zone to represent your internal network.

☛ **Highlight** the DNS server you have just created and click on DNS and New Zone.

☛ **Click** on Primary and then the Next button.

☛ **Give** the Zone a name (e.g. ACME.CO.UK), tab to the Zone file field and click on the Next button to accept the default file name.

☛ **Click** on the Finish button. The new Zone is created with some default entries.

All that is left is to enter the host names you wish to resolve. Taking our DILBERT example in the Domain ACME.CO.UK, we would simply highlight the Zone ACME.CO.UK and click on New Host.

Enter the host name (DILBERT) and the address (10.1.1.2), and click on Add Host. Your Domain should now look like the right-hand pane [Fig 5]. Now, include the address of your DNS server in the DNS configuration tab of all your clients (first in the list) and you're ready to go.

Refer to my advice on the use of DHCP in an earlier issue to see how you can make that change across all your clients in a matter of seconds. Now if you drop to the DOS prompt and type PING DILBERT.ACME.CO.UK you should receive a reply from device 10.1.1.2 — and away you go.

PCW CONTACTS

Bob Walder *can be contacted via the PCW editorial office (address, p10) or email* **networks@ pcw.co.uk**

The fun starts here!

Fast, flexible and innovative — and a cool black desktop is just for starters: Apple's great white hope is the exciting MacOS 8.5. Cliff Joseph brings you his first impressions of the beta release.

I t seems like there's just no stopping the new Apple. September saw the release of the iMac, the most exciting new product to come out of Apple for years, and October brings us MacOS 8.5 — also known as Allegro, within Apple. Many PC users have been asking whether it's worth upgrading to Windows 98, but there are no such doubts about MacOS 8.5. The Mac OS is currently at version 8.1, so the move from 8.1 to 8.5 may not seem like much of a change. But OS 8.5 really does have a lot of very worthwhile new features in it.

Loose ends

The first thing it does is to tidy up a few loose ends left over from pre-PowerPC days. The MacOS still contains a few bits of old code written for Motorola's original 68000 series of processors, despite the fact that Apple switched to PowerPC processors several years ago. MacOS 8.5 has replaced some of this old code with **native PowerPC code** that should run a lot faster. QuickDraw, the software that handles the Mac's screen display, is now entirely native so screen redrawing should be much snappier. The AppleScript scripting system is also native now, so scripts should run much more quickly. This will please the publishing people who use AppleScript to automate their workflow routines, as will the improved performance when copying files across a network.

These under-the-bonnet changes are welcome, but the **great strength of the Mac** has always been its interface, and there are plenty of changes to the Mac interface in OS 8.5. The biggest new feature here is the Appearances control panel. This enables you to create "themes" for the appearance of your Mac's desktop. And as well as choosing
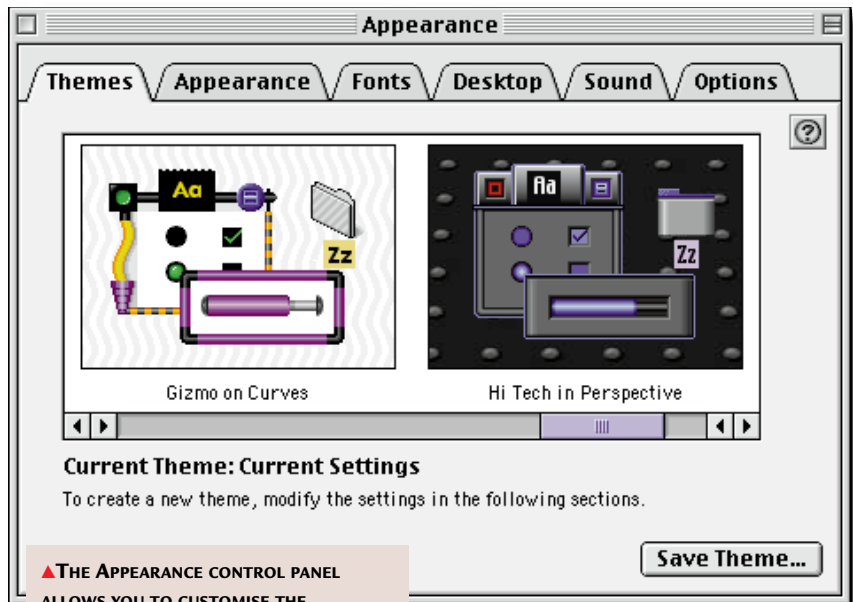
▲THE APPEARANCE CONTROL PANEL ALLOWS YOU TO CUSTOMISE THE APPEARANCE OF THE MAC DESKTOP USING THEMES SUCH AS GIZMO AND HI-TECH

different fonts and background pictures, themes also allow you to alter the appearance of items such as title bars and scrollbars. The beta release we tested contained two themes called **Gizmo** and **Hi-tech**. Gizmo is a brightly-coloured theme that will probably appeal to kids, while Hi-tech applies a cool, black look to the Mac desktop. Once you've selected the basic theme, you can then alter individual settings such as the colour used to highlight objects or whether or not to have collapsible

The Mac is still capable of coming up with some innovative surprises

windows. And you can add "soundtracks", which link new sound effects to actions such as opening windows or moving items around the desktop.

When you've got the desktop looking and sounding the way you want it, you can save your changes as a custom theme of your own. Themes are stored in their own folder in the main System Folder so it's easy to add new themes, and people will soon probably start to exchange home-made themes on the internet. The

changes you make here affect the way your desktop looks, but there are other improvements in OS 8.5 that affect how the desktop works. Thankfully, you can now resize and re-order the columns of information that appear when you view the contents of a window in List view. If you want to see the size of a file before any other piece of information, you just click on the header of the "Size" column and drag it to the required position. You can also use the Preferences dialog to set global viewing options for all windows, rather than having to set each window's options separately. **Scrollbars work differently now**, providing "live" scrolling so that the contents of windows scroll as you drag the scrollbar. The scrollbar also has a "proportional" option now. This is similar to the way that scrollbars work in Windows, with the size of the scrollbar varying to indicate the proportion of the window you are currently viewing.

In the dock

When you open more than one application, the names of those applications still appear as a pull-down list in the upper right-hand corner of the screen. However, you can now tear off this list so that it remains on-screen as a

small floating palette called the Applications Dock. You can switch from one application to another by clicking the application's name in the dock. This is a useful new feature, but it would be even better if you could switch between applications using the keyboard, as you can in Windows.

Favourite things

There's one new feature that you may not be able to use straight away. Apple has finally gotten around to redesigning the standard **Open and Save dialog boxes**. These now allow you to select multiple documents, as well as storing a list of your most recently-used files. There's a new option called "favourites", which allows you to create a pull-down list of your most frequently-used folders. This allows you to quickly place documents within these folders without having to navigate through the contents of your hard disk to find them. The only problem here is that applications need to be upgraded before they can make full use of the new Open and Save features. Fortunately, the changes needed are quite small, so hopefully developers will be able to post updates on the internet soon after the release of OS 8.5. The fact that some of these new features are already standard items in Windows 95 and 98 is a sad testimony to the neglect that the Mac OS suffered under some of Apple's previous managements. However, the

Mac is still capable of coming up with some innovative surprises of its own. Perhaps the single **most important improvement** in OS 8.5 is the new Find command. The Find dialog box now contains three tabbed pages that allow you to perform different types of searches. The standard Find File option is still there, allowing you to quickly locate files on specific hard disks by searching for attributes such as their name, date or size. However, you can now use an intelligent search engine that Apple calls "Sherlock" to locate files by providing details of their content. If I want to locate documents that contain references to the new iMac, I

OS 8.5 provides some real fun … more than you can say about Windows 98

just type "iMac" into the dialog box and Sherlock will locate all the relevant documents on my hard disk and even sort them into order of relevance. Best of
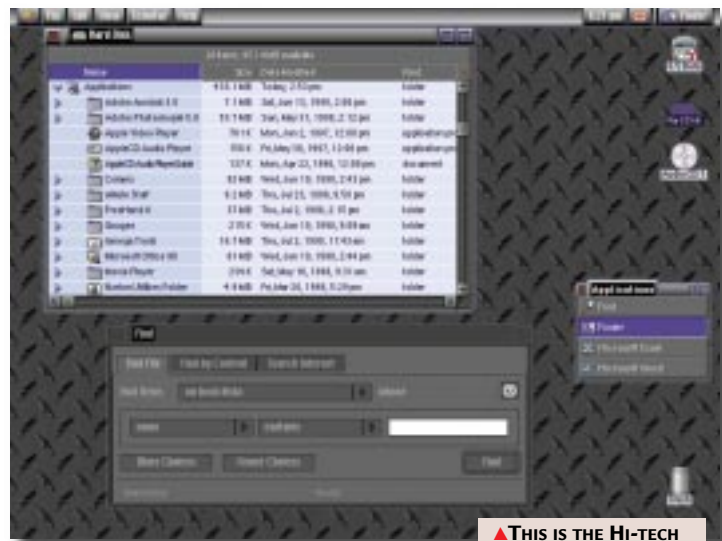
all, though, is the new **Internet Search option**. Just type in the information you're looking for, and Sherlock will connect to the internet and search using whatever search engine you specify. It then compiles a list of web pages that are relevant, and when you click any page in this list it will display a summary of the content of that page in a panel below the main list. The beta version of OS 8.5 that we tested had a few problems when it came to narrowing the scope of internet searches, but hopefully these problems will have been ironed out in the final shipping version. There are quite a few features that we haven't even touched on — such as the new AppleScript tools — but we'll take a closer look at specific features in future editions of this column.

OS 8.5 may only be a stepping stone on the way to OS X — the real biggie that is due this time next year — but it's definitely worth buying. It provides powerful new features, improved performance and — in the Appearance control panel — some real fun. And that's a lot more than you can say about Windows 98.
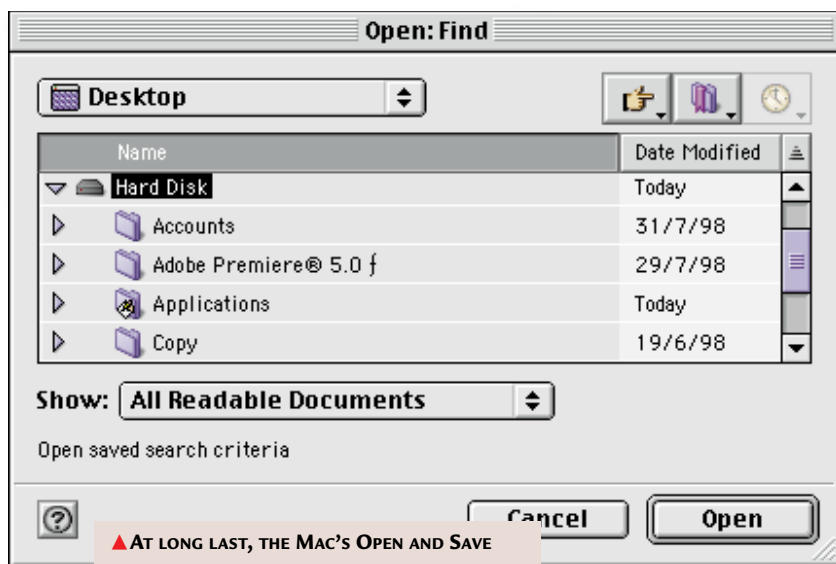
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leisure lines

So many good *Games* have been launched recently that it's been tough deciding which ones to review. Some of those you can see here are the new **X-Files** game, Ian Livingstone's **Deathtrap Dungeon**, and the classic arcade-actioner, **Cannon Fodder**. The *CDs* section has something for everyone: there's the new **Encyclopaedia Britannica**, the updated version of the **Who's Who?** Database, and Cosmopolitan's **Virtual Makeover** kit (featuring stunning pictures of me!). In the *Kids* section we bring you the truth about **Barney**, the purple dinosaur — our results defy all others! We also have reviews of Tivola's **Oscar The Balloonist And The Secrets Of The Forest**, and a new children's word-processing package called **Write Away**. In the *Books* section we find out how one man survived the gold-rush year on the internet, in **Burn Rate**, and we review the **Ultimate Guide to the Palm Pilot**. You also get a chance to win a copy of the Ultimate Guide, or an actual Palm Pilot!

We have three superb *Competitions* this month. You can have a go at winning a complete home office from **Hewlett-Packard**, modems and video cameras from **Pace**, or a monitor from **Hansol**. This month's *Retro* ignites the spark of the Acorn Electron, while *Brainteasers* gives you something to puzzle over. And there's the *PCW Crossword*, giving you the chance to win a copy of the new **Chambers dictionary**. So take a break, relax, and enjoy!

ETELKA CLARK, *LEISURE LINES* EDITOR
ETELKAC@VNU.CO.UK

Contents

The X-Files Game

The answer is out there and you'll enjoy finding it.

After the mammoth success of the X-Files television series, it was inevitable that a computer game would follow. After two years in the making, the designers have wisely opted not to let you play the part of Scully or Mulder, but to interact with both of them as FBI agent Craig Willmore. You are investigating their disappearance, so before you can start chatting to Scully about her pout and lovely, floaty, red hair… *(sorry, forgive me)* you've got to find them. Skinner has come over to Seattle to give you some pointers, but mostly seems to stand around looking broody and sullen while you look for his agents.

There are hours' worth of QuickTime movie footage to look at, all of it original stuff. There's no doubt that this is a quality product. It's scripted by X-Files writers, packed full of Files minutiae, and features a lot of the usual suspects. It is a little over-reliant on point-and-click, though, and navigating through the game involves an awful lot of clicking. The odd, dimly-lit mood of the television show has been successfully recreated but you will need the brightness control on your monitor set to maximum to pick out the clues. The icon interface is well thought out, meaning that there are no complicated key combinations to learn, and despite all the clicking it's worth it for the moody, atmospheric QuickTime clips.

PAUL TRUEMAN

▶ THE QUIRKY, BROODING MOOD OF THE TV SHOW COMES ACROSS IN THE GAME

PCW DETAILS

★★★★

Price *£39.99*
Contact *Fox Interactive 01753 549442*
www.foxinteractive.com
System Requirements *Windows 95, P120, 16Mb RAM, quad-speed CD-ROM, 250Mb free hard-drive space.*

Vangers

Shooting, driving, strategy and more; you *must* get this game.

▶ HARD DRIVING AND HOSTILE TERRAIN

Is it a space game, a strategy game, or a driving game? There is no niche for such a diverse game as Vangers: One for the Road. The background story takes up four pages of the instruction manual, yet unlike the run-up to many other games it is a fascinating read. Thumping music throughout maintains the sense of tension established in the opening pages, and the graphics suck you in to the heart of the action. As a human/bug hybrid — a Vanger — you're running for your life. The terrain is hostile but your vehicle should see you through. As your trading activities earn you more credits, you'll be able to buy a better and more manoeuvrable form of transport and, most importantly, weaponry. But why weaponry? The colony, that's why; nasty bug-like creatures that operate with a collective mind who will, given half a chance, use your body as a fertile host for their larvae.

If you're after a fast moving shoot-em-up that will test your keyboard driving skills, keep you entertained with an engaging story line, despatch you to a distant part of the known galaxy and throw in a bit of trading strategy on the side, then Vangers: One for the Road is for you. If you're not, then you cannot possibly be a serious PC games player.

NIK RAWLINSON

▲ **4WD** OWNERS, EAT YOUR HEART OUT!

PCW DETAILS

★★★★

Price *£39.99*
Contact *Interactive Magic 01344 409399*
www.imagicgames.co.uk
System Requirements *Windows 95, 98 or NT 4, Pentium 133MHz processor (166MHz recommended), 16Mb RAM (32Mb recommended), 50Mb free hard-drive space (200Mb recommended), quad-speed CD-ROM, SVGA video card, mouse, Windows-compatible sound card.*

Outwars

It's easy to get into Outwars and satisfying to blast those bugs.

Outwars marks the end of Microsoft's inhibitions about games with violence. It's a shoot-em-up in the mould of Battle Zone, with a mission-based structure and a continuing storyline. You play a marine, fighting a war against hordes of evil alien bugs as they swarm around your bases and attempt to destroy humanity.

I was initially pretty sceptical about Outwars, particularly when first loading it up. The graphics are not going to win any major prizes, especially when compared to the likes of Unreal. The game uses Direct 3D, so any reasonably modern 3D accelerator card can be used. Once you're into a campaign, you'll be treated to some cheesy video briefings before each mission, but they do help to build the plot. The game has various missions and they're not just confined to killing

▲THE GRAPHICS AREN'T GREAT BUT THE SOUNDTRACK IS PRETTY TASTY

bugs; they are designed to be dynamic, so you'll be given a briefing which could change halfway through if the aliens do something unexpected. One aspect that really adds to the atmosphere is the music, which sounds very cinematic and is, in fact, as good as a few action film soundtracks that I've heard.

Outwars is a little formulaic and doesn't look particularly great. But it offers good gameplay and manages to achieve that elusive feeling of immersion in each mission. Definitely worth a look if you enjoyed Battle Zone or fancy some Starship Troopers-style bug-blasting.
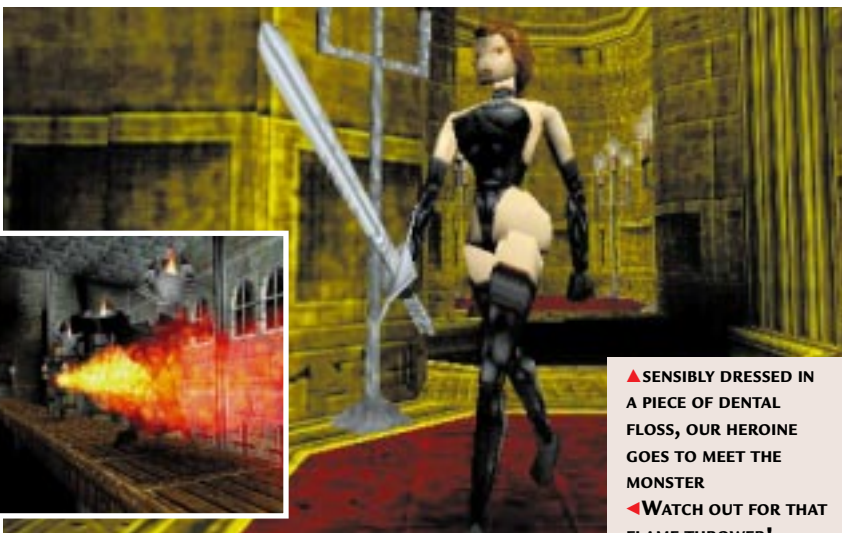
DAVID FEARON

PCW DETAILS

★★★
Price £34.99
Contact Microsoft 0345 002000
www.microsoft.com/games/outwars
System Requirements Windows 95, Pentium 133, 16Mb RAM, 25Mb available hard-drive space, quad-speed CD-ROM drive, Direct3D-compatible graphics accelerator recommended.

Deathtrap Dungeon

The graphics are grungy but there's plenty of gruesome gore.

▲SENSIBLY DRESSED IN A PIECE OF DENTAL FLOSS, OUR HEROINE GOES TO MEET THE MONSTER
◄WATCH OUT FOR THAT FLAME THROWER!
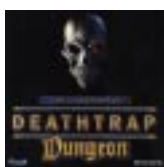
Years ago, the ruler of Fang built a huge labyrinth beneath the hillside, filled with traps of devilish cunning and a large collection of wild beasties. Supreme among them was Melkor the Red Dragon. Offering a reward to anyone who could enter the dungeon and live to talk about it, the Baron sat back and watched hundreds go to their deaths.

The two characters you control in this game seem to think they can do better. There's a massively-proportioned one-man slaughterhouse, who is getting bored of decapitating anyone who looks at him a bit "funny" and wants the reward so he can retire. Needless to say, the female character wears very few clothes and has a torso that would put the TV Gladiators to shame. The idea is to work your way through the ten levels of the castle and dungeon, beginning at the Spire and working through to the final confrontation with the Red Dragon (or will it be the Baron himself?).

This is one of the more inventively-packaged games we've seen so far this year, with Deathtrap Dungeon playing cards included, as well as a *Fighting Fantasy* novel written by Ian Livingstone. Although the graphics are a bit disappointing, this game should suit gore fans down to the ground.

PAUL TRUEMAN

PCW DETAILS

★★★★
Price £34.99
Contact Eidos 0181 636 3000
www.eidos.com
System Requirements Pentium 90MHz processor (P166MHz), Windows 95, 16Mb RAM (32Mb rec.), 120Mb free hard-drive space, double-speed CD-ROM.

M.A.X. 2

Strategy/shoot-em-up gaming to the max. It's only 2D, though.

Mankind has been admitted to the The Concord, an intergalactic parliament, but all sides are wary of each other. When a renegade group of humans land on an unexplored planet and discover an active alien base, it's time for you to step in and sort out a troubled situation. Your first mission is a relatively simple one but as you play on and the story unfolds, you will have to take command of constructing whole human bases and defeating the hordes of aliens that threaten the Concord.

You marshal your troops, and more than 25 tanks, guns and troop carriers — in other words, the usual carriers of death and destruction required in a game such as this this. Combat is easily arranged: you simply "point and click" on the troops you want, and then click on the enemy to be engaged. As with all good strategy games, though, there is more to it than simply co-ordinating vast planetary punch-ups: you have to use your resources to make initial purchases of engineers and construction machines, and work out what to build with them.

Essentially, M.A.X. 2 provides you with everything you ever wanted from a two-dimensional strategy shoot-em-up, apart from looks. If it's a brainteasing strategy-simulation you're after rather than jaw-dropping graphics, then this is the one for you.

PAUL TRUEMAN

▲ THERE ARE PLENTY OF MISSIONS TO KEEP YOU OCCUPIED
◀ PARLIAMENT HAS BEEN DISSOLVED!

PCW DETAILS

★★★

Price *£34.99*
Contact *Interplay 01628 423666*
www.interplay.com
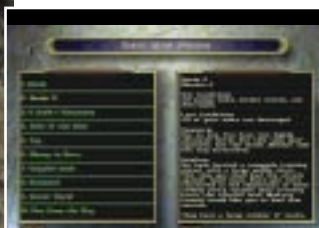**System Requirements** *Windows 95, Pentium 133MHz processor, 16Mb RAM, 30Mb free hard-drive space, double-speed CD-ROM.*

Cannon Fodder

The price is right, the game is classic and the action is furious.

Among Cannon Fodder's stars are, apparently, James Dean, Elvis Presley, Vera Lynn, Norman Wisdom and JR Ewing from Dallas. However, who plays who is anyone's guess.

As the leader, you allocate lots of little men to assist you in carrying out scenes of mass carnage and destruction, wiping out the enemy and blasting their buildings. As you and your recruits run, swim and ski your way through combat, firing bazookas, throwing grenades, driving tanks and flying choppers, you must fight your way through 24 missions. Each mission takes place in a different zone within which you must follow instructions in order to complete each raid. You can kill yourself and your own, if you wish, and blast other innocents who misguidedly cross your fearsome path. Although all this sounds gruesome, the comical graphics are reminiscent of a bedtime story. The first missions are very similar, with little graphical variation, but persevere through this surprisingly more-ish game and it actually becomes quite engaging. The explosions are satisfying and your bullets never run out.

Cannon Fodder is a shoot-em-up of the old school — if you want fast, all-action, adventure, then don't bother. But if you think you would enjoy playing a classic-style game, then at only £4.99, you could do a whole lot worse.

HELEN FORTGANG

▲ OUT ON A MISSION TO SEEK AND DESTROY
(INSET) SMALL GUYS, BIG BAZOOKER

PCW DETAILS

★★★

Price *£4.99*
Contact *0171 721 8767*
www.sold-out.co.uk
System Requirements *MS-DOS 5.0, 486 DX33MHz, 4Mb RAM (configured to expanded memory), double-speed CD-ROM drive, SoundBlaster-compatible sound card.*

Who's Who 1897-1998

An easy-to-search century's-worth of who was, and who is, who.

If you use the original CD-ROM version of Who's Who on Windows 95 and plan to upgrade to 98, be prepared to lose your temper — under Windows 98 you will only be able to run this latest version of Who's Who, and it will cost you £300.

Still, at least this new edition, Who's Who 1897-1998, does contain all the latest information. The previous version of the CD-ROM incorporated all nine editions of Who's Who, from 1897 to 1995. This one incorporates all that information, plus Who's Who 1998 and information not available elsewhere about those who died in the intervening years. Otherwise, the look and feel is as before.

It's easy to use, and finding the information you require is a doddle. In fact, the search facility is the main strength of this CD-ROM. You can search by virtually any criteria to locate people by date, profession or interest, and how many liked salmon fishing or those who have some sort of association with Jack the Ripper (playwright Ray Cooney, actors Michael Caine and Peter Ustinov, and author Colin Wilson among others).

There are over 110,000 biographies of people who have in one sense or another contributed to the political, economic, scientific, social and artistic life of Great Britain during the past century. This CD is an essential for any researcher.

PAUL BEGG
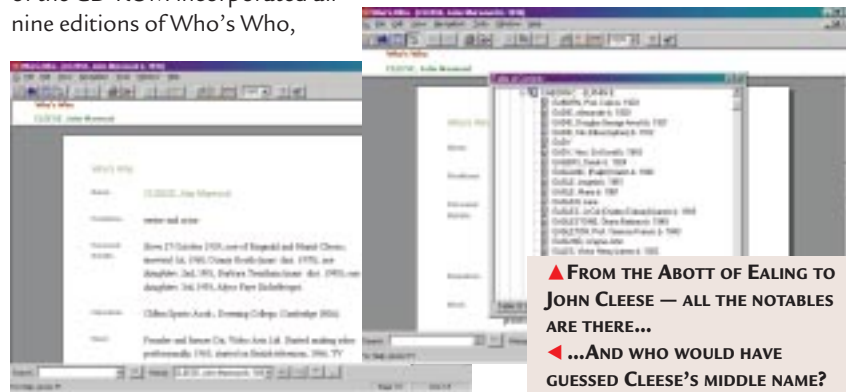
▲ FROM THE ABOTT OF EALING TO JOHN CLEESE — ALL THE NOTABLES ARE THERE…
◄ …AND WHO WOULD HAVE GUESSED CLEESE'S MIDDLE NAME?

PCW DETAILS

★★★★★

Price £293.75
Contact Oxford University Press 01865 267979
System Requirements Windows 3.1 or later (95 recommended), 33MHz 486 minimum, 4Mb RAM, 20Mb disk space, VGA graphics, mouse, quad-speed CD-ROM drive.

Hamlet

No winter of discontent here.

Hamlet is the latest addition to the award-winning BBC Shakespeare on CD-ROM series which so far includes Romeo and Juliet, Macbeth, A Midsummer Night's Dream, Julius Caesar, and The Tempest. When compared to videos, audio cassettes and books, these CDs, costing more than £100, are a significant investment for any school or home budget. They do contain a lot of information, however, and it's wrapped up in a way that makes Shakespeare palatable, even to those who can't tell their Rosencrantz from their Guildenstern and who don't really want to — which in itself is an achievement.

The CD contains the whole of the play in audio (which unfortunately doesn't work on an audio player), the full text of the play (the Alexander Edition, as recommended by many examining boards), and 20 minutes of video from the BBC production of the play. There is also extensive background information: the life and times of Shakespeare, the themes and language of his plays, a full study and commentary of the play and plot, and information about actors, acting, sets, scenery, costume, music and art.
In addition, there's a range of critical opinions and interviews with various actors. Among them are Kevin Kline and Richard Briars discussing Hamlet, and Derek Jacobi, who plays Hamlet in the BBC production. If Hamlet is on your course this year, this CD-ROM could represent money excellently spent.

PAUL BEGG

◄ YOU COULD GET TO KNOW POOR YORICK BETTER THAN EVEN HAMLET DID BY THE TIME YOU'VE EXHAUSTED THIS CD'S WEALTH OF INFORMATION ▼

PCW DETAILS

★★★★★

Price £117
Contact Collins Educational 0181 741 7070
System Requirements Windows 3.1 or later, 66MHz 486 or higher, 8Mb RAM minimum, 16Mb recommended, VGA graphics, mouse, sound.

Cosmopolitan - Virtual Makeover

Bored with your make-up? Unhappy with your hair? Load up a picture and try before you dye.

▲ **Before…**
◀ **… and after.**
A new me!

Have you ever thought a certain hairstyle would suit you, then had the chop and realised that it didn't? Or have you ever been for a cosmetic makeover, had tons of the wrong-colour foundation and lipstick caked over you, and then had to thank the beautician through a tight, false smile as she tells you how lovely you look? With the Cosmo Virtual Makeover, you need not suffer any of these dramas. Just scan a photo or take a digital picture of yourself, load it, and you are at liberty to try as many hairstyles, lipsticks and eye shadows as you like. Be a blonde, cut it short, wear it up, try the new cocoa-colour lipstick… or the red? With over 150 different styles, 20 hair colours and many different shades of cosmetic, you can change your image as many times as you like. This CD keeps up with the ever-changing world of beauty and fashion, too. Users can visit the virtual makeover web site and download the latest styles, makeup colours and beauty tips.

Having sold over 300,000 copies already in the US, Virtual Makeover is also a hit with the male population. Men can try out new haircuts or judge whether a moustache or beard would suit them. This CD is great fun to use and will certainly generate a few laughs — how do I look, folks?

ETELKA CLARK

PCW DETAILS

★★★★

Price £29.99
Contact Roderick Manhattan Group 0181 875 4444
www.virtualmakeover.co.uk
System Requirements Windows 95/ 3.1, 486DX-66MHz or higher, 2X CD-ROM.

Britannica CD 98 Standard Edition

You may have to search carefully to get exactly the answers you want.

This latest version of Britannica on CD contains some 44 million words within 72,000 articles, including all the text of the multimedia edition and some beyond the latest printed version. The emphasis is firmly on text. There's little to illustrate it beyond some diagrams and photos, and it's reminiscent of the previous, CD97 edition — it, too, uses a Netscape interface, unlike the Internet Explorer-based multimedia edition.

As you'd expect, the standard way of navigating the disc is by a choice of Boolean or natural language searching.

PCW DETAILS

★★★

Price £99
Contact Britannica 0800 282433
System Requirements 486/25MHz processor minimum (486/33 or higher recommended). Windows 95, Windows NT 3.51 or 4.0, or Windows 3.x (3.1 requires the Win32s update), or16Mb RAM is recommended 16Mb free hard-disk space 640 x 480 resolution.

The absence of the ? wildcard from searches shouldn't be a problem in the encyclopaedia but might prove awkward when querying the integral Websters dictionary. Britannica also offers the Compass, where you click on a map to learn about countries, or the Spectrum, which is ten broad categories of knowledge.

All the options are simple to use and the content is almost beyond reproach, but I was not impressed by the natural language searching. All responses are evaluated for their relevance to your
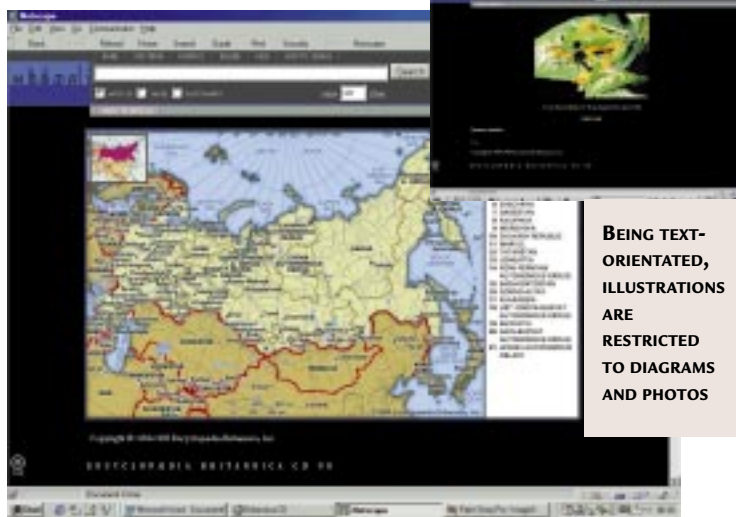
Being text-orientated, illustrations are restricted to diagrams and photos

question, but ask how an inkjet printer works and you will be rewarded with the biography of Geoffrey Tory, printer to the King of France, born 1480, died 1533! The CD-ROM performed reasonably fast on our P233MMX but you may find it a bit slow on a lesser-specced machine.

JOHN SABINE

Oscar, the Balloonist, and the Secrets of the Forest

Two educational programs featuring forest and farm. But younger children may need adult help.

European software can be a treat in the midst of all this US animation, and on that basis Oscar the Balloonist, from German software publisher Tivola, is worth a look. Oscar features in two programs: one explores the forest through the seasons, the other discovers the farm. Learning begins when you take off in Oscar's balloon in search of Carmela, his walking, talking toybox.

In Secrets of the Forest, Carmela is hidden deep in the forest. Once you've found her, you can play games and puzzles. None of these are particularly novel: there are interactive scenes to click on and games where you match animals to habitats or their favourite food. The feature that makes this game enjoyable is the beautiful detail of the presentation and being able to watch the forest change through the seasons. There is a lot to learn. The programs are aimed at 4- to 8-year-olds but younger children will need adult help with some of the games, especially as there is not the option to have puzzles solved for you if you don't know the answer. For
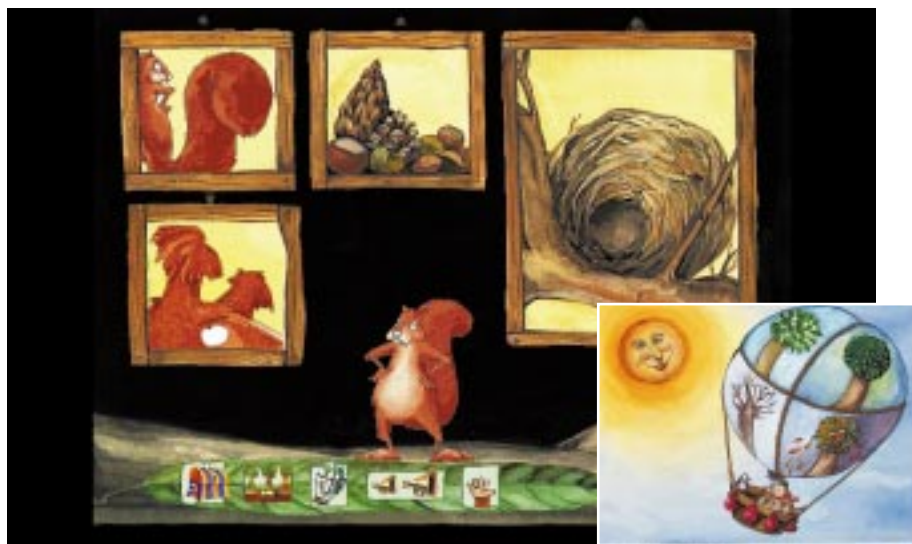
younger children, Oscar the Balloonist, Discover the Farm, is probably the easier of the two programs in the series.

DEBBIE DAVIS

▲ **WHAT'S THE SECRET, SQUIRREL?**
▶ **UP, UP AND AWAY IN OSCAR'S SEASONS BALLOON**

PCW DETAILS

★★★

Price *£24.99*
Contact *Tivola 0181 741 8011*
System Requirements *Windows 3.1 or higher/Mac.*

Write Away!

A versatile word processor to help children gain writing skills.

It may not seem necessary for children to have a word processor of their own, but Write Away! is a word processor designed with the specific aim of helping children develop their writing skills as required by Key Stages 1 to 3 of the National Curriculum. Primarily for classroom use, its strength is its

PCW DETAILS

★★★★

Price *£134 (£114.04 ex VAT) for a five-user licence. Talking Write Away! costs £165 (£193.88 ex VAT) for a five-user licence. Toolbox is £392 (£333.62 ex VAT) for a five-user licence.*
Contact *BlackCat 01874 622114*
System Requirements *Windows 3.1 or later, 386 or higher, 4Mb RAM, 5Mb disk space, VGA graphics, mouse.*

customisability, which lets it be adapted to suit the particular needs of a wide range of children across various age groups and with varying abilities. There is even a talking version available for children with special needs and visual disabilities, who will benefit considerably from the spoken confirmation of what is typed.

To help develop creative skills and encourage children to write, Write Away! has several tools: a writing planner for organising writing projects, a good outliner for plotting a story, and writing hints to help with the differences between writing styles (e.g. news and fiction). There's also a word bank containing up to 100 words, a word game to reinforce correct spelling, and

◀ **THERE IS EVEN A VERSION FOR KIDS WITH SPECIAL NEEDS**

an easy-to-use spelling checker that remembers frequently misspelled words. Write Away! also permits graphics, fonts, and changes to the colour of the "paper" and the words.

Write Away! comes as a standalone application or as part of Toolbox, a collection of five Maths and Science applications for Key Stages 1 to 3 of the National Curriculum.

PAUL BEGG

ActiMates Interactive Barney

He's cute, chatty, cuddly and great fun for kids but like other dinosaurs he'll soon become extinct.

When the toy industry gathered earlier this year for its annual fair, there was a newcomer who boasted the biggest stand. Microsoft had arrived in toyland and Interactive Barney, its talking dinosaur, has been tipped as the hot gift this Christmas.

Powered by six batteries and 257Kb of built-in memory, Barney talks, turns tricks, and sings. Setting up a separate transmitter that plugs into your joystick port and loading Barney's CD-ROM, allows him to receive electronic radiation over a distance of 38cm and join in with what's on-screen. As you play shape-sorting games or recognise letters, Barney is there, with encouragement and praise.

All this cutting-edge technology seems to "wow" the adults, but what do the children think? We sent this king of gadgets and gizmos home with some kiddies to find out. Our youngest testers, rising two years old, were unsure — on first sight it even reduced one of them to tears. For our three- to five-year-olds, it was love at first sight. But, as any parent will tell you, a child falling head over heels in love with a purple dinosaur is nothing new. And after a few weeks of playing, Barney was beginning to show the side effects of his radiation therapy. Some of the drawbacks were technical.

When they played before bedtime, our testers wanted Barney, who was younger than them, to rest in bed. That meant he was more than 38cm from the computer screen. So, he missed all his cues. "He's gone to sleep," explained a parent, but she was on a slippery slope. "Why has he got his eyes open then?" asked one tester. Even worse, another squeezed his toes and he started singing "If you're happy and you know it, clap your hands". When he was receiving transmissions, he didn't always do what was expected, given what was on-screen. And why didn't he have anything to say when our testers were playing with their new Bananas in Pyjamas CD-ROM? Our testers began to think Barney was a party pooper.

Technical drawbacks were minor. But what really caught Barney out was the way children at this age play; they have a surfeit of imagination and there aren't many toys that can keep up: Lego does, Teddy bears, old clothes and cardboard boxes do well, too. But a toy like Barney depends so much on imposing the game that it becomes a hindrance. It wasn't so much that our testers fell out of love with Barney; they just stopped playing with him.

DEBBIE DAVIS

▲ **TOUCH-SENSITIVE BARNEY'S VOCABULARY IS 4,000 WORDS: COVER HIS EYES AND HE SAYS 'PEEK-A-BOO'; SQUEEZE HIS TOES AND HE'LL SING SONGS**

WIN Hewlett-Packard hardware!

HEWLETT PACKARD®

Expanding Possibilities

Hewlett-Packard is giving *PCW* readers the chance to win equipment to create the complete home office. One person will win a Hewlett-

Packard PC from the new **Pavilion 6000 series**, a **DeskJet 710C** printer and a **ScanJet 4100C** scanner. Two runners-up will receive a **ScanJet 4100C** scanner each.

The latest PCs in the HP Pavilion 6000 series deliver everything consumers need to work, play and learn at home. They feature 350MHz Intel Pentium II processors, the ATi Rage Pro AGP 2X graphics card, DVD 2X CD-ROMs, 56K data/fax modems with telephony, and Polk audio stereo speakers with PowerPort technology to deliver a rich, high-quality sound for a "theatre-in-your-home" experience. You will also receive three months' free full internet access and email, and the latest **leading software** to satisfy all your computing needs — MS Windows 98, MS Works, MS Money 98, MS Encarta World Atlas 98, and lots more.

The DeskJet 710C printer has been designed to enable users to create brilliant, image-

rich projects at home and in the office. With its compact design and quiet operation, it offers great photo-quality printing on any media, including plain and recycled paper, HP paper, transparencies, banners, iron-on transfers and greeting cards. It can print, on average, four pages per minute and will hold up to 100 sheets of single plain paper at a time.

The ScanJet 4100C rounds off this complete set of home/office equipment beautifully. It is an affordable colour scanner designed to make at-home scanning virtually effortless. HP's Intelligent Scanning Technology, Universal Serial Bus connectivity, separate scan and copy buttons, and a recessed cabling design make it perfect for first-time, space-conscious users.

■ **For a chance to win** this great Hewlett-Packard equipment, just answer the following question:

How many sheets of single plain paper can the DeskJet 710C hold at any one time?

(A) 10   (B) 100   (C) 1000

☞ *See the box [left] for entry details*.

RULES OF ENTRY

This competition is open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and Hewlett-Packard. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of competition prizes.

HOW TO ENTER THE COMPETITION
1. Via our web site at www.pcw.co.uk, or
2. Write your name, address and daytime telephone number on a postcard, or on the back of a sealed envelope. Mark your card 'PCW/HP Competition' and send it to: P.O. Box 191, Woking, Surrey GU21 1FT, by Friday 6th November 1998. *Please state clearly on your competition entry if you do not wish to receive promotional material from other companies*.

WIN a Hansol monitor!

Hansol is giving *PCW* readers the chance to win one **17in 700P monitor** and one 19in **Mazellan 900P monitor**. The 700P, worth £219, offers the highest resolution and refresh rates as well as the finest dot pitch. It also has high display capabilities, including an ultra-fine 26mm dot pitch. With a high 75Hz flicker-free refresh at 1280x1024 resolution and 1600x1280 maximum resolution at 66.6Hz, crisp lines and sharp text are assured.

The Mazellan 900P, worth £375, is both PC and Mac compatible. Its screen resolution can reach 1600x1200 at 75Hz and features a dot pitch of 26mm. Each of the 22 on-screen functions is controlled by a single rotary dial on the lower front bezel. Hansol currently enjoys one of the lowest failure rates in the monitor market, and the 900P is set to continue this trend.

Both monitors are environmentally friendly. Not only do they surpass MPR-II and Energy Star guidelines, but they also comply with the strict TCO 95 world standards for low radiation, heat reduction, energy efficiency, recycling ability and ergonomics.

■ **For a chance to win** one of these super monitors, just answer the following question:
What does Hansol currently enjoy?
(A) The lowest failure rates in the monitor market
(B) Cod and chips
(C) Seventies disco
☛ *See the box below for details on how to enter the competition*.

WIN top Pace prizes!

Pace, the groovy modem maker, is going modem mad this month. One lucky *PCW* reader can win a complete video-conferencing solution. And five runners-up can win Pace Colour Video Cameras!
The video-conferencing solution is worth £340. It is two Pace 56 Voice modems and two Pace Colour Video cameras. The winner can keep one set and give the other away to a friend with whom they would like to communicate.
The Pace 56 Voice external modem

Winner Best Modem

supports data, voice and fax and is flash-upgradable to V.90. It doubles as a full-duplex hands-free speaker-phone through its built-in microphone and speaker. Pace has focused on developing a 56K product with features not found on other modems. Each model supports UK Caller ID, giving access to a caller's number even before the phone rings.

The Pace colour video camera is designed to sit on top of a PC monitor. We have two versions you can win: one which connects to your PC's USB port, and another which connects to your PC using a supplied PCI card. Used in conjunction with a modem, you will be able to send video mail and bridge the gap between distant friends and relatives with video-conferencing.

■ **For a chance to win** this great Pace equipment, just answer this question:
Where does the colour video camera sit?
(A) Under your desk
(B) On top of your PC monitor
(C) On top of your head

HOW TO ENTER THE COMPETITIONS

1. Via our web site at www.pcw.co.uk, or
2. Write your name, address and daytime telephone number on a postcard, or on the back of a sealed envelope. Mark your card(s) with the name of the competition(s) you are entering, and send to: P.O. Box 191, Woking, Surrey GU21 1FT, by Friday 6th November 1998. *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

Palm Pilot: The Ultimate Guide

The PalmPilot PDA has been on the market for a few years now and is so simple to use that you would hardly think there was a need for a guide. O'Reilly, however, sees things differently and has produced this weighty tome dealing, in the most part, with fairly simple and self-explanatory subjects, or those things that are detailed in the instruction manual which comes with your PDA. The advantage of this book, however, is that it can afford to take more space to argue its case, which is great for novice users, but for anyone experienced in the use of a PalmPilot, it can become tedious.

Nevertheless, there are many useful tips, hints and anecdotes: everything is touched upon, from the name of the palm-tree mascot of Palm Computing
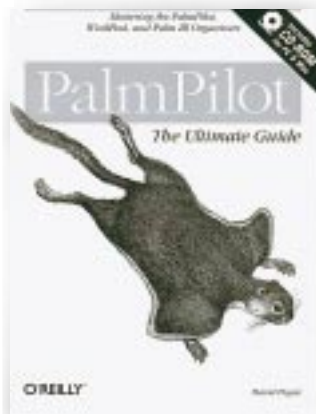
(it's Shelldon, if you must know) to a quick way of hiding the currency prefix in your expenses. Many areas are examined in depth: a 30-page chapter on programming for the Palm series should serve as a quick-start guide to getting your device to do what you want it to.

A whole array of undocumented procedures can be found scattered throughout the pages of this book. Everything seems to be covered, from unofficial easter eggs which show two-tone photographs of the original US Robotics programmers, to more useful functions such as opening the "developer's backdoor", which is a facility to force your PalmPilot to wait *ad infinitum* for your PC to respond,

instead of timing out as it usually would in an unresponsive Hot Sync session.

The real value of this book, though, is not so much what is written between the covers, but what is attached to them, for inside the back cover you will find a CD-ROM crammed with useful shareware and upgrades. Although many of these utilities are available on the internet, having them supplied on CD saves downloading them yourself.

NIK RAWLINSON

☞ *We are giving away an actual PalmPilot PDA as well as copies of PalmPilot: The Ultimate Guide. To win one of these prizes, put your name and address on a postcard and send it to "PCW/ PalmPilot" at the Editorial Office address (p10) to arrive before 16th October. PCW competition rules apply.*

PCW DETAILS

★★★

PALMPILOT: THE ULTIMATE GUIDE
Author *David Pogue*
Publisher *O'Reilly*
ISBN *1-56592-420-7*
Price *£21.95*

Java Beans for Real Programmers

A Java Bean is the equivalent of an ActiveX control, being a piece of Java code that can be used as a component in a visual programming tool such as Inprise JBuilder, Symantec Visual Café, or Sybase PowerJ. That makes this a key topic for anyone doing rapid application development with Java.

Peter Wayner's book is described on the cover as a "high-end developer's guide" but it is suitable for anyone who has done a little Java programming. It starts at the beginning, explaining the essential concepts behind Bean programming, and goes on to explain

PCW DETAILS

★★★

JAVA BEANS FOR REAL PROGRAMMERS
Author *Peter Wayner*
Publisher *AP Professional*
ISBN *0-12-738670-X*
Price *£29.95*

how to create a simple Bean. Next comes a chapter on persistence, which means saving a Bean to a file or other datastream. There is a brief explanation of events, a vital part

of Beans technology which allows Beans to communicate with each other and work in an event-driven environment. Finally, the book explains how to make international Beans and how to use BeanInfo, the object that lets Beans plug in to a visual programming tool. At the back of the book are a series of examples showing how to use events to link several different Beans. This is a book which scores highly on readability and real-world usefulness. There are plenty of tips and examples, along with warnings about common pitfalls. But there is no accompanying CD.

The problem with the book is that it is too narrow in scope. There is nothing about Enterprise JavaBeans (Beans that
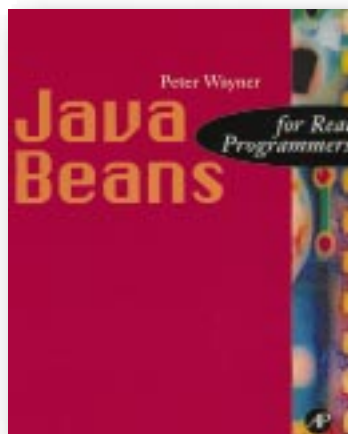
run on the server in a web or multi-tier application). There is nothing about integrating JavaBeans with databases. There is no coverage of Swing, the official new visual components built as JavaBeans. Since the concept of a visual builder is so important for JavaBeans, I would also have liked some comment on how to create and use Beans with the leading Java development tools. The book as it stands has an attractive simplicity, but as a specialist title it should provide more in-depth treatment. It is still a worthwhile read, though, offering a clear guide to the basics of coding with Beans.
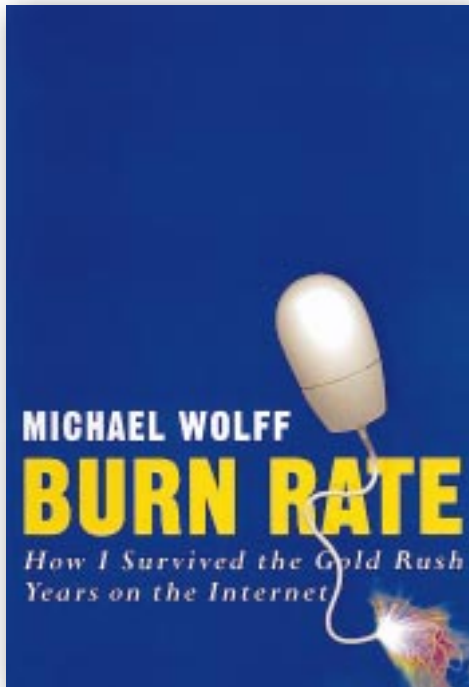
TIM ANDERSON

Burn Rate — How I Survived the Gold Rush Years on the Internet

Information superhighway. There! I wrote it. There is a fabulous whiff of nostalgia hanging around this phrase, now as much a relic of early nineties slang as "grunge' and "Generation X". It is becoming increasingly difficult to clearly remember the time when the internet was still effectively just a very popular bulletin-board and email service for a few thousand geeks. Michael Wolff's book charts the growth of the internet and its glamourous offspring, the World Wide Web, from the perspective of someone who was sucked into the madness of "the gold rush years".

In 1994, Wolff (originally a journalist) came up with the idea of replicating the US success of TVGuide, with NetGuide which would point people towards what was good on the web. As a self-proclaimed pioneer of the new media, Wolff writes about his early, hilarious meetings with venture capitalists and other would-be financial partners, few of whom had any clue about what it was they wanted to invest their millions in, other than it was supposed to be the Next Big Thing and therefore definitely A Good Thing. "It's a mass medium. Everybody will have internet. Everybody will have to have internet…like television," says one such idiot, before promptly paying Wolff $10m to use his "database" of a few thousand "outdated site lists", believing that he had, in fact, bought the internet itself.

Apart from this initial stroke of good fortune, the theme of the book soon becomes obvious: no-one was making money from the internet. The title *Burn Rate* refers to the disparity between a company's overheads and its revenues, which in Wolff's case was running at half a million dollars a month. The book covers Wolff's increasingly desperate attempts to keep his company afloat despite its continual financial haemorrhaging. He jumps into bed with unscrupulous venture

> *Apart from an initial stroke of good fortune, the theme of the book soon becomes obvious: no-one was making money from the net*

capitalists, watches his mad hippy friend, Louis Rossetto, found a publishing phenomenon with *Wired* magazine, and attempts to screw money out of anyone who's ever heard of the internet.

This is a delightfully honest read, ludicrous and informative by turns, that should delight anyone with an interest in the black arts of financing and, of course, that information superhighway thingumajig.

PAUL TRUEMAN

PCW DETAILS

★★★★★

BURN RATE
Author *Michael Wolff*
Publisher *Weidenfeld and Nicholson*
ISBN *0-297-84261-7*
Price *£18.99*

Acorn angst

Simon Collin bought an Acorn Electron — but then wished he'd bought a BBC Micro instead.

Like the majority of the computing world, I am tied to a PC desktop. There is nothing wrong with this, but sometimes you forget about the other platforms. Last week, I tested out one of the latest, greatest Acorn computers: its RISC processor flew through complex graphics applications with impressive ease. Seeing the little green acorn logo reminded me of my own Acorn, bought in the early eighties when I was young and impressionable.

Acorn started off in the public arena with its Atom computer. This neat little machine came either in kit form or pre-assembled and had a similar target audience to the Sinclair range (the ZX80 and ZX81, in particular). It was powered by a 6502 processor running at 1MHz and had 2Kb of RAM fitted as standard, along with text and graphics display modes and a sound channel. I didn't buy an Atom. Instead, I went with the pack and picked a ZX80. At the time, the personal computer world was split down the middle by the choice of processor in the box. This mattered, because you had to program the unit in Assembler — it took me months to get any new program to run properly! The two main processors were the 6502 from Motorola and the Z80 from Zilog. I preferred the Z80 architecture, and always considered the 6502 a difficult brute with which to design and program.

Acorn launched a new computer to coincide with a TV series that explained how computers worked. The 6502-based BBC Micro went down a storm and the astonishing demand outstripped supply for weeks. The popularity of the BBC Micro was even more astonishing, given that early models could overheat and were temperamental. Everyone but me had a BBC Micro: I bought a Sharp MZ-80K (another Z80-based computer). Acorn decided to move downmarket (even though the BBC Micro was very reasonably priced) and, in 1983, it launched the Acorn Electron. Having

▲ **The Acorn Electron was a modest forerunner of Acorn's later RISC-based computers**

resisted temptation for so long, I bought an Electron. Naturally, this was the wrong model to have selected. It was a cut-down, slowed-down cheaper version of the BBC Micro and sold for £199. It could run most of the same software as the BBC Micro, but not everything. It could not accept the same hardware add-ons, and, worst of all, had almost no expansion capabilities.

My first 6502-based computer was not a classic like its bigger brother, the BBC Micro. It had the same brand of Motorola processor but running at a sluggish 1.8MHz and 32Kb of RAM as standard. Its 32Kb of ROM included the by-now famous version of the BBC BASIC programming language. This was more Pascal than Basic, and allowed clever programmers to access the operating system and run a BASIC application at impressive speeds. The Electron had good graphics and text modes for the time, and supported text to 80x32 and graphics resolutions up to 640x256 pixels with eight colours. Best of all, as with the BBC Micro, the Electron supported a good sound chip that, with a little programming effort,

The Electron sold modestly and was not the success Acorn had hoped

could produce a modest symphony. To store program files there was a socket for a standard cassette recorder, together with three types of video output ranging from a standard TV modulator through to RGB connectors for those with a high-resolution monitor. If only Acorn had spent some of the video connector budget on other types of connector!

If you wanted to expand your Electron, you had to buy an add-on unit that plugged into the back of the machine and included various extra ports. There were three types of these add-ons but only two were ever sold in reasonable quantities: the Plus 1 provided a serial and parallel printer port, while the Plus 3 supported a 3.5in disk drive. For the adventurous, third-party manufacturers sold add-ons that included an EPROM programmer (essential for any self-respecting hacker at the time) and memory expansion units.

The Electron provided a modest stepping stone towards Acorn's current range of great RISC-based computers. But I should have bought a BBC Micro — the big brother that sold fantastically and still has a very active user environment on the web. The Electron sold modestly and was not the great budget-level success Acorn had hoped, but then, following an unexpected runaway success is a difficult task.

brainteasers

Quickie

All the Runners and Riders:
There were some horses and riders in a field, and I counted 78 legs and 35 heads. How many of each were there?

This Month's Prize Puzzle

This is not as difficult as it might at first appear, but should provide a diversion for an hour or so.

Four men, Alf, Bob, Colin and Dave, are married to Kath, Liz, Mary and Nell — although not necessarily respectively. Each of these eight people purchase postage stamps — each buying as many stamps as the denomination of the stamp in pence, and no person buying the same denomination as any other. Each husband spent exactly P more than his wife — P being less than £1.00. Colin spent 9p more than Nell, and Dave spent 23p more than Liz. Mary spent more than everyone else except her husband.
Who is married to whom?

Send your answer on a postcard, or on the back of an empty sealed envelope, to:
   PCW Prize Puzzle - November 1998,
   P.O. Box 99,
   Harrogate,
   N. Yorks HG2 0XJ

Entries should arrive no later than the 20th November 1998. Please do not send solutions on floppy disks, emails, or in envelopes.

Winner of August 1998 Prize Puzzle

Over 100 entries were received for our not-so-easy-as-it-first-appears logic problem. Most of you came up with the correct solution: *Olive loved Ivor*. The winning card came from Gordon Brindle of Witney, Oxfordshire. Congratulations, Gordon, your prize will be with you shortly. To the also-rans — keep trying, you could be the next winner.

JJ CLESSA

prize crossword
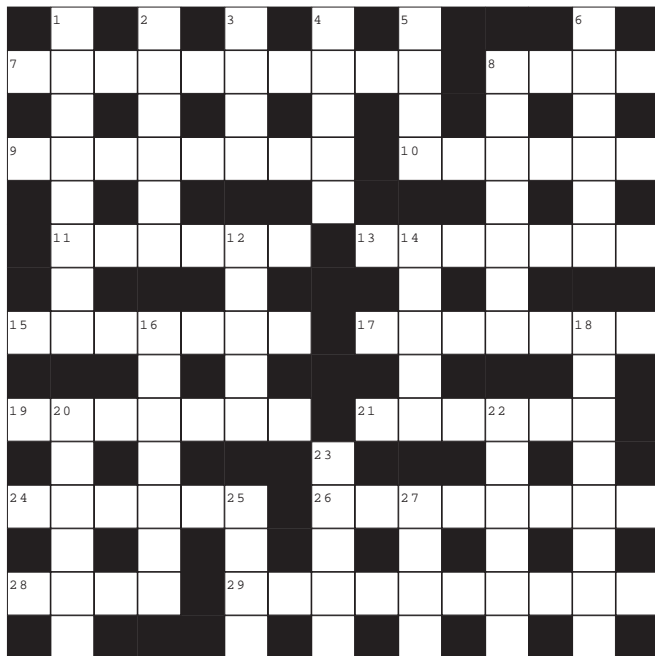
It's only words — and there are millions of them in the new Chambers Dictionary. Each month, one lucky *PCW* crossword entrant wins one. This time, it could be you. Send your completed crossword to **"PCW November Prize Crossword", VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 23rd October, 1998.**
Please state clearly if you do not wish to receive promotional material from other companies.
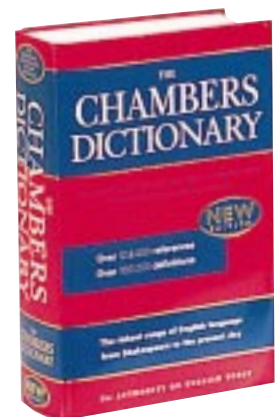
ACROSS

7   William Gibson's non-physical binary world (10)
8   Permanently resident operating firmware (4)
9   Single functional blocks of ciruitry (8)
10   CAD's D (6)
11   Audible mouse activities (6)
13   Brings in data from elsewhere (7)
15   Printer's roller (7)
17   The C of CPU (7)
19   The O of OCR (7)
21   Like a network made to resemble the workings of the human brain (6)
24   *See 10 across*
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23   Superficial scratch (5)
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October solutions

ACROSS

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11 Device 12 Read-only
13 Home 15 POP 16 Macro
19 Refresh 20 Corrupt
23 Basic 25 VGA 26 Font
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32 Band 33 DRam 34 Wafer

DOWN

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4 Spear 5 Toyota 6 Peel
10 Tempest 14 Opera
17 Ripen 18 Romance
21 Referral 22 Overeat
24 Impede 27 Study 29 Oval
31 Oven

Order form

Use this form when you order by phone, fax or post.

➡ DON'T FORGET THE ELECTRONIC VERSION OF THIS ORDER FORM. SEE THIS MONTH'S CD-ROM.

ALWAYS KEEP A COPY !

SUPPLIER'S DETAILS

COMPANY ....

SALESPERSON'S NAME ....

ADDRESS ....

....

....

.... POSTCODE ....

DATE OF TELEPHONE ORDER .... / .... / .... TIME ....

ORDER REFERENCE NUMBER (IF QUOTED) ....
DISPATCH REFERENCE NUMBER ....

CUSTOMER DETAILS

NAME ....

COMPANY ....

ADDRESS ....

....

....

.... POSTCODE ....

DATE OF TELEPHONE ORDER .... / .... / ....

ORDERED BY: ☐ TELEPHONE ☐ FAX ☐ POST

ADVERT APPEARED IN PCW:
ISSUE DATE .... PAGE ....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £
....			
....			
....			
....			
....			

SUB-TOTAL	
DISCOUNT	
CARRIAGE	
SURCHARGES	
VAT	
TOTAL	

METHOD OF PAYMENT

☐ PERSONAL CHEQUE ☐ PURCHASE ORDER ☐ CREDIT CARD
☐ C.O.D ☐ DEBIT CARD ☐ OTHER (SPECIFY) ....

CARD COMPANY .... START DATE .... / .... / ....

ISSUE NUMBER (debit cards only) .... EXPIRY DATE .... / .... / ....

CARD NUMBER (below)

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

DELIVERY DETAILS

DELIVERED TO (ADDRESS)

(IF DIFFERENT FROM ABOVE) ....

....

.... POSTCODE ....

BUYER'S CHECK LIST

AGREED DELIVERY DATE .... / .... / ....

☐ TERMS OF WARRANTY ☐ MONEY BACK ☐ RETURNS POLICY

☐ COST OF EXTENDED WARRANTY ☐ HELPLINE

Details: ....

SIGNED .... DATE ..../........../........... DAYTIME TELEPHONE NUMBER ....

DIRECT BUYERS WORLD

Contents

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If ordering goods over £100, we recommend you use your credit card. A credit card not only provides similar protection as that guaranteed under the "Buyers Charter" but, more importantly, it offers the additional advantage of reimbursement to your account of all monies paid for goods not received — usually within 28 days — when a company ceases to trade.

All the best buys are here

Sometimes you just want to know the names of the best products, when they were reviewed, how much they cost and where you can get them. That's where our new, no-nonsense buyer's guide comes in. Over the following four pages we've picked out the outstanding PCs, peripherals and software packages that we can recommend without hesitation. To make it even easier, we've included the current manufacturer's contact number and price (inc VAT), as well as details about when and where we reviewed the product. For the full review, why not check out *PCW* on CD-ROM? Updated quarterly on a rolling basis, *PCW* on CD-ROM contains the full editorial from the past 24 issues, in searchable Adobe Acrobat format — it even comes with a copy of Acrobat for viewing, searching and printing. Each CD costs just £9.95 including postage and packing, or £8.96 for subscribers. **Call 01795 414870** to order your copy, or turn to the *PCW* Reader Offers on pages 306 and 307 for further details.

GORDON LAING, Editor

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If things go wrong
Mail order protection scheme
Anthony George, our Customer Services Manager, is here to help you if things go wrong or if you have a complaint about advertisements that have appeared in Personal Computer World. Write to him with details of the complaint and he will contact you.

Anthony George
Customer Relations Department
VNU Business Publications
VNU House, 32 - 34 Broadwick Street
London W1A 2HG

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3. Have taken all reasonable steps to effect delivery or refund.
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a) A copy of the original advertisement from which the goods were ordered.
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5. Submit claims so as to arrive "NOT EARLIER THAN TWENTY EIGHT DAYS AND NOT LATER THAN THREE MONTHS" from the official sale date of the magazine.
Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated. Claims received outside this period will not qualify for consideration for compensation under the "Buyers Charter".
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The "Buyer's Charter" is designed to safeguard the PRIVATE individual reader. It does not provide protection to any companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. Similarly, cover is not provided for orders placed from or to any overseas companies or for goods purchased for resale.

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While limited protection still exists when Internet purchases are made from companies based in the UK, no such protection exists — other than that afforded by certain major credid card companies — relative to goods ordered from overseas organisations' web sites. We would strongly urge all readers to consider the following before purchasing via the Internet:
Advertised prices invariably exclude transportation charges, do not account for currency fluctuations, Customs & Exise duties, VAT, documentation and/or importation restrictions. Statutory rights are virtually non-existent, guarantees — if any — impossible to enforce, replacement of faulty goods and/or refunds difficult to obtain, no official regulatory organisation to call upon for assistance when things go wrong, and no protection under the "Buyers Charter".

best buys

Mesh
K6 3D 300A

Sporting AMD's K6-2 processor, this system from Mesh has everything you could want: 1Mb of L2 cache, a 40X CD-ROM drive, a superb set of six speakers with an AWE64 sound card and a lovely ADI 5GT monitor. But it's the blistering speed that will have you reaching for your credit card.

➠ *PCW October '98, p187*

Price *£1,198.50,* **Contact** *Mesh 0181 452 1111* **Also Recommended:** *Mertec Home Media* **Price** *£1,173.83* **Contact** *Mertec 01792 473700* •*Panrix Nitro 3D,* **Price** *£1,173.83* **Contact** *Panrix 01132 444958 (both PCW Oct '98)*

HIGH-END NOTEBOOK

IBM
ThinkPad 600

Built for the road warrior, this thin, light, notebook excels in its build quality. Based around a variety of processors, ranging from a Pentium 233MMX and going right up to a Mobile PII 266, it also has a huge 4Gb hard drive, 32Mb RAM and a 13.3in TFT screen.

➠ *PCW July '98, p79*

Price *£4266.43,* **Contact** *IBM 0870 601 0136* **Also Recommended:** *Gateway Solo 9100* **Price** *£3876.33* **Contact** *Gateway 0800 282000 (PCW June 1998)*

MID-RANGE PC:

Dotlink
Power Tower-400SE

If you want a PII 400 for under a grand ex VAT, you could do a lot worse than this Dotlink. It has 64Mb of RAM and a 5Gb hard drive, as well as a 56K modem and SmartSuite 97. And with a BX board there is plenty of room for later expansion.
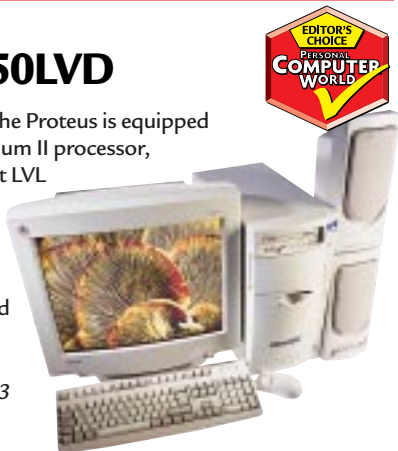
➠ *PCW October '98, p89*

Price *£1,174* **Contact** *Dotlink 0181 903 6508* **Also Recommended:** *Mesh Elite Professional PII* **Price** *£1,145,* **Contact** *Mesh 0181 452 1111* •*Dan Dantum II/W5* **Price** *£1,175* **Contact** *Dan 0181 830 1100 (both PCW July '98)*

MID-RANGE NOTEBOOK:

Gateway
Solo 2500-S6266SE

With a fantastic spec for an incredibly low price, the Gateway Solo 2500 is enough to keep any mobile professional happy. It comes with a Mobile PII 266MHz processor, a whopping 64Mb RAM as standard and a huge 4Gb hard drive. Add in a glorious 13.3in TFT screen supported by 2Mb of graphics RAM and you have yourself a perfect system.

➠ *PCW October '98, p94*

Price *£2,500* **Contact** *Gateway 0800 55200* **Also Recommended:** *Viglen Dossier M* **Price** *£2,466.33* **Contact** *Viglen 0181 758 7000 (PCW August '98)*

HIGH-END PC

Atlantic
Proteus 450LVD

A true high-end PC, the Proteus is equipped with a 450MHz Pentium II processor, plus the lightning-fast LVL SCSI Cheetah hard drive from Seagate. It's also stuffed with extra peripherals including CD-RW and DVD-ROM drives. A real dream machine.

➠ *PCW Nov '98, p163*

Price *£2,499* **Contact** *Atlantic 0990 134725* **Also Recommended:** *Armari MB-450 Workstation* **Price** *£2,899* **Contact** *Armari 0181 810 7441* •*Dell Precision Work'stn 410* **Price** *£3,390* **Contact** *Dell 0870 9073335 (both in this issue)*

PDA

Hewlett-Packard
620LX

For cutting-edge technology in your pocket, Hewlett-Packard's 620LX has to be the only choice. It's based on the latest Windows CE2 operating system and is the first PDA we've seen with a colour screen. It's utterly gorgeous and, at £799, a serious threat to many notebooks. PDA fans should also check out the Psion Series 5 and the 3Com PalmPilot.

➠ *PCW May '98 p262.*
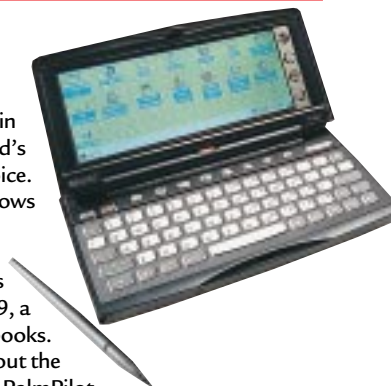
Price *£799* **Contact** *HP 0990 474747.* **Also Recommended:** *Psion Series 5* **Price** *£429.9* **Contact** *Psion 0990 143050* • *3Com PalmPilot Pro* **Price** *£229* **Contact** *3Com 0800 225252 (Both PCW May 1998)*

Hewlett-Packard
DeskJet 890C

As all-round colour inkjet printers go, Hewlett-Packard's DeskJet 890C is hard to fault. Equally happy with photos or business graphics, it's our choice for the home or small office. Meanwhile, those on a budget should look no further than Canon's BJC-250, but those wanting the bigger picture will not be disappointed with HP's DeskJet 1120C A3.

➡ *PCW September '98 p186.*

Price £317.25 **Contact** *HP 0990 474747* **Also Recommended:** *Canon BJC-250* **Price** *£116.33* **Contact** *Canon 0121 680 8062* •*HP DeskJet1120c* **Price** *£446.50* **Contact** *HP 0990 474747 (both PCW Sept '98)*

Epson
Stylus Photo 700

Colour inkjets have split into two categories, with this type clearly designed to reproduce the most realistic colour photographic prints. Epson has for a long time been the undisputed leader and its Stylus Photo 700 is our choice for inkjet photo printing. However, Lexmark comes very close behind with its 5700.

➡ *PCW September '98, p188.*

Price £273 **Contact** *Epson 01442 261144* **Also Recommended:** *Lexmark 5700* **Price** *£229* **Contact** *Lexmark 01628 481500 (PCW September 1998)*

Panasonic
KX-P6300

A decent laser printer at under £200 excluding VAT? That's Panasonic's KX-P6300, which not only turns out great results in fast time but also boasts one of the smallest footprints of any printer. Its unusual vertical design, along with being a great-value all-rounder, made it our Editor's Choice in our entry-level laser group test.

➡ *PCW February '98, p194*

Price £217.38 **Contact** *Panasonic 0500 404041* **Also Recommended:** *Kyocera FS-600* **Price** *£280.83* **Contact** *Kyocera 01734 311500* •*Minolta PagePro 6* **Price** *£351.33* **Contact** *Minolta 01908 200400 (both PCW Feb '98)*

Hewlett-Packard
LaserJet 4000TN

King of the laser printers, Hewlett-Packard has impressed us yet again with its latest office machine. Being 25 percent faster than the LaserJet 5, with 10,000-page toner cartridge, two 250-sheet input trays, network interfaces as standard and boasting superb output, the 4000TN should be the first choice as an office workhorse.

➡ *PCW February '98 p77*

Price £1662.63 **Contact** *HP 0990 474747* **Also Recommended:** *QMS DeskLaser 1400P* **Price** *£938.83* **Contact** *QMS 01784 442255 (PCW March 1998)*

Hewlett-Packard
LaserJet 3100

Good laser-print quality from this quiet machine. It's intelligent enough to detect a document dropped into its feeder and it will launch an idiot-proof menu for scanning, copying and emailing. Fast, accurate OCR and 2Mb memory for incoming faxes when the paper supply is exhausted, makes the 3100 an ideal multifunction device.

➡ *PCW June '98, p83*

Price £629 **Contact** *HP 0990 474747* **Also Recommended:** *Canon MultiPASS MPC20* **Price** *£370.13* **Contact** *Canon 0181 773 3173 (PCW January 1998)*

Umax
Astra 610P

Once again, the Umax Astra 610P parallel-port scanner has won our budget flatbed scanner group test, boasting an unbeatable combination of performance and value. Note that our three recommended scanners require enhanced parallel ports found only on modern PCs, so older systems, or users wanting top performance, should stick to SCSI.

➡ *PCW September '98, p229.*
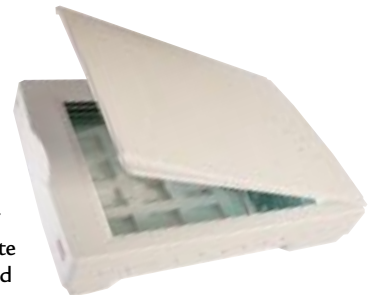
Price £69.33 **Contact** *Umax 01344 871329* **Also Recommended:** *Agfa SnapScan 310P* **Price** *£116.50* **Contact** *Agfa 0181 231 4200* •*Microtek Phantom 330CX* **Price** *£75.95* **Contact** *Microtek 01908 317797 (PCW Sept '98)*

best buys

DIGITAL CAMERA

Kodak
DC260

Once again Kodak has produced the best digital camera for under £1,000. Not only does it have a high resolution, producing excellent images at 1,536x1,024 pixels but also has a 3X zoom. Add its advanced features, including scripting facilities and you have a highly desirable and indispensable camera.

➧ *PCW October '98, p226*

Price *£899* **Contact** *Kodak 0800 281487* **Also Recommended:** *Epson PhotoPC 700* **Price** *£587.50* **Contact** *Epson 0800 289622* •*Ricoh RDC-4300* **Price** *£599* **Contact** *Ricoh 01782 753355 (both PCW October 1998)*

MODEM

BT
Prologue K56EV Plus Modem

This smart little K56Flex modem features a headset, allowing it to be used as a hands-free telephone. Add a pair of speakers and you've got a full duplex speakerphone. The K56EV also supports AudioSpan (SVD) operation, enabling voice and data to be transmitted simultaneously.

➧ *PCW July '98 p80*

Price *£119.95* **Contact** *Direct Source 0118 981 9960* **Also Recommended:** *Pace 56 Voice* **Price** *£139* **Contact** *PMC 0990 561001 (PCW November 1997)*

SOUND CARD

Terratec
EWS64 S

A cut-down version of the heavyweight EWS64XL, Terratec's S model still boasts much of the same sampling and processing capabilities and is also a great games card with accelerated DirectSound and positional 3D audio. There's a digital I/O option, upgradeable sample memory and the decent software bundle includes Cubasis AV.

➧ *PCW July '98 p210*
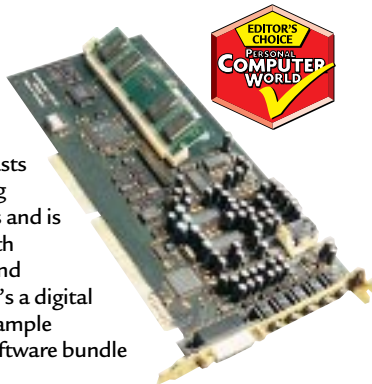
Price *£149.23* **Contact** *Terratec 01600 772111* **Also Recommended:** *Creative Labs AWE 64 Gold* **Price** *£129.25* **Contact** *Creative Labs 01245 265265 (PCW July 1998)*

MONITOR

Nokia
Multigraph 447Za

No matter what you do, it's vital to get a good monitor with a clean, flicker-free display. In April 1998's group test we looked at 17in models and found Nokia's Multigraph 447Za to be the best in our entry-level category. Those with more to spend should check out the Mitsubishi, (*see panel, below*) which was our Editor's Choice in the high-end section.

➧ *PCW April '98 p204.*

Price *£440.63* **Contact** *Nokia 01793 512809* **Also Recommended:** *Mitsubishi DiamondPro 700* **Price** *£569.88* **Contact** *Mitsubishi 01707 276100 (PCW April 1998)*

REMOVABLE STORAGE

SyQuest
SparQ

With such differing capacities, interfaces and prices, there's no one removable storage device to satisfy all needs. As an overflow for your existing hard disk, the SyQuest SparQ is a clear winner, boasting excellent performance and low price. The external Iomega Zip Plus offers a good combination of ease of use and portability.

➧ *PCW May '98 p196*

Price *£169.99* **Contact** *SyQuest 01189 880207* **Also Recommended:** *Iomega Zip Plus* **Price** *£143.83* **Contact** *Iomega 07000 466342* •*Iomega Jaz 2Gb* **Price** *£441.71* **Contact** *Iomega 07000 466342 (both PCW August 1998)*

GRAPHICS CARD

Diamond
Viper V550

Sporting Riva's latest TNT chipset, the Viper V550 gives absolutely storming 3D performance, with a full 3D feature set and good image quality to boot. Its 16Mb of RAM also spells ultra-high 2D desktop resolutions for standard Windows apps.

➧ *PCW November '98, p198*

Price *Approx £150* **Contact** *Diamond Multimedia 0118 944 4400* **Also Recommended:** *MetaByte Wicked 3D* **Price** *£211.50* **Contact** *Watford Electronics 01582 745555 (PCW November 1998)*

ACCOUNTING

Tas Books
MYOB

Ideal for the owner-manager and good for bookkeepers too, Mind Your Own Business (MYOB) is our choice for accountancy software. We also recommend TAS Books which offers good bookkeeping and very powerful analysis.
➡ *PCW June '98 p198*

Price £229.13 **Contact** *Bestware 01752 201901*
Also Recommended: *TAS Books* **Price** £116.33 **Contact** *Megatech 01372 727274 (PCW June 1998)*

PERSONAL FINANCE

Microsoft
Money Financial Suite 98

Microsoft Money Financial Suite 98 is our choice for personal finance. It offers online banking and updating facilities, plus Sage compatibility, all at a bargain price.
➡ *PCW May '98 p196*

Price £49.99 **Contact** *Microsoft 0345 002000*
Also Recommended: *Quicken 98* **Price** £39.99 **Contact** *Intuit 0181 990 5500 (PCW June 1998)*

DATABASE

Microsoft
Access 97

The industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 97 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.
➡ *PCW November '98 p220*

Price £299 **Contact** *Microsoft 0345 002000*
Also Recommended: *FileMaker Pro 4* **Price** £169
Contact *FileMaker 0845 603 9100 (PCW November 1998)*

DTP

Serif
PagePlus 5

Inexpensive, easy to use and surprisingly well equipped. PagePlus 5 offers extremely capable desktop publishing. Those wanting the choice of professional publishers will have to fork out more for Quark XPress 4.0.
➡ *PCW June '98 p132*

Price £99.95 Contact *Serif 0800 376 7070*
Also Recommended: *Quark XPress 4* **Price** £1,169 **Contact** *Quark 01483 454397 (PCW June 1998)*

IMAGE EDITING

Adobe
Photoshop 5

With version 5, Photoshop is better than ever, although some web designers will want a little more. The legendary Paint Shop Pro and fun PhotoDeluxe cater at entry level.
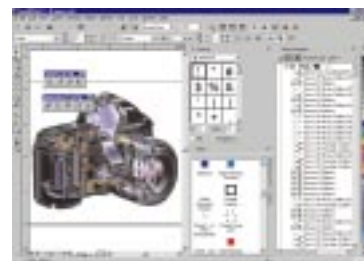➡ *PCW June '98 p88*

Price £763.75. **Contact** *Adobe 0181 606 4001* **Also Recommended:** *Adobe PhotoDeluxe 2* **Price** £57.58 **Contact** *Adobe 0181 606 4001* • *Paintshop Pro 4* **Price** £58.69 **Contact** *Digital Workshop 01295 258335 (both PCW Dec '97)*

DRAWING

Corel
CorelDraw 8

Not one of Corel's classic years but this is still the Windows drawing package to own. Version 8 of the giant suite boasts better drawing and new interactive tools. Budget drawers should check out the Micrografx Windows Draw 6.
➡ *PCW October '98, p203*

Price £464.13 **Contact** *Corel 0800 581028* **Also Recommended:** *Adobe Illustrator* **Price** £351.32 **Contact** *Adobe 0181 606 4000* • *Freehand* **Price** £327.82 **Contact** *Macromedia 01344 458600 (both October 1998)*

ChipChat goes to church

For those whose grades didn't quite get them into priest school, the internet, as ever, comes to the rescue. The Universal Life Church at www.ulc.org/ulc/ is offering instant online ordinations. By supplying little more than your name, you can append Reverend to the front of your name and the site will produce a certificate to prove it, as well as permit you to perform baptisms and marriages. Those willing to part with a little cash can go one better — instant canonisation, and a slip of paper that will declare you to be a living saint. Not up for that? How about a Doctorate — a snip at $20!
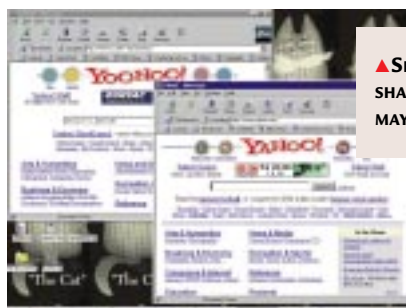
Better than the real thing

Two sites that took our fancy this month imitate well-known internet home pages. Yoohoo www.e-z.net/

▲ **SEARCH AND YE SHALL FIND… OR MAYBE NOT**

~ed1/yoohoo/ plays on the design of well-known search engine, Yahoo. Some great links from here should have you chuckling for the rest of the month, but if you exhaust them you might like to try the Microsoft parody, Winblows www.winblows.com. So real, you could believe it came straight from MS HQ in

Caption Competition

The open-mouthed gape of our Editorial Assistant, Etelka, provoked a record number of entries to the September caption competition, and so it was she who had the honour of selecting Linda Van Heerden of Hove as the winner of our £20 book token. Linda's entry, "Turn it off — it's a picture of Bill Clinton naked in the White House", was one of the small number received that didn't mention Viagra. There's no caption competition this month, so instead send lots of pictures of yourselves to brighten up the *PCW* office, to ChipChat at the usual address (p10) or email them to captions@pcw.co.uk.

Redmond. It's also a great place for grabbing screensavers or cards for your PC, while the Yoohoo site has a cheeky link back to Yahoo, claiming it to be "based on Yoohoo"!

Oops

☞ Last month's Reliability Survey attributed a letter to U-net when it should, of course, have read Uunet.

☞ Page 313 of the October issue used a shot of Unreal's packaging to illustrate what was, clearly, a review of Gex3D.

next month

UNDERCOVER PC GROUP TEST

Choosing the best vendor when buying a PC is as difficult as deciding what components you want. We **buy undercover from 10 vendors** and give you the full SP on their sales, delivery, build quality and support.

COMMUNICATIONS

How to **get connected**. We look at all the options: hardware, software and wireless technologies.

XEON SERVERS

Power on the network.

NETWARE 5 VS NT5

The battle of the **network** bruisers.

Plus: marketing your web site.